



Evidence Solutions, Inc.

And the

Arizona Association for Justice

Driving Into the Future: Cars, Technology and the Law

Present:

Vehicles: Rolling Treasure Troves of Data

December 7, 2018

Presented by:

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## Electronic Data Forensics & Black Boxes

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## The Commute

- Enter your car without a key
- Make periodic cell phone calls
- Check in with On-Star
- Two way GPS navigation effortlessly routes you around tie ups
- You buy gas with your fast pass
- You pickup your medications
  - and walk out without stopping at a cash register

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## What potential trail have you left behind?

- Your car unlocked with a proximity sensor.
  - Near Field Communication
    - It is used to unlock vehicles when the Keyless remote fob is nearby
    - What if someone else was tracking that?
    - Near field communication is also a wireless phone technology that would allow you to make payments for products from your cell phone

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## What potential trail have left behind?

- Cell phones with GPS
  - Your carrier may have a database of where you have been
  - Cell phone records are kept for.... well it depends.

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## What potential trail have left behind?

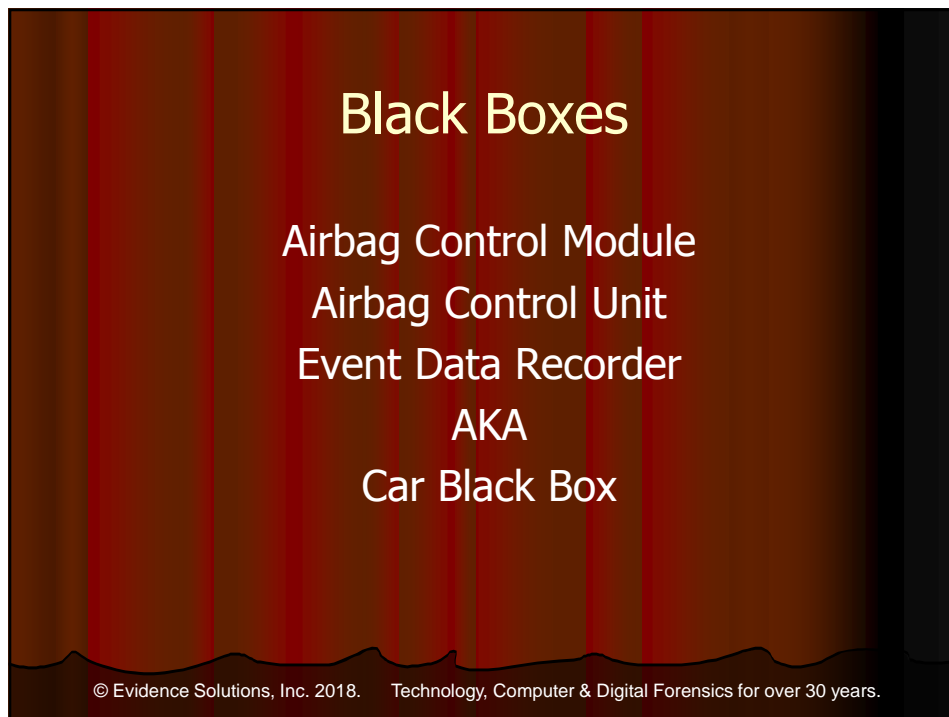
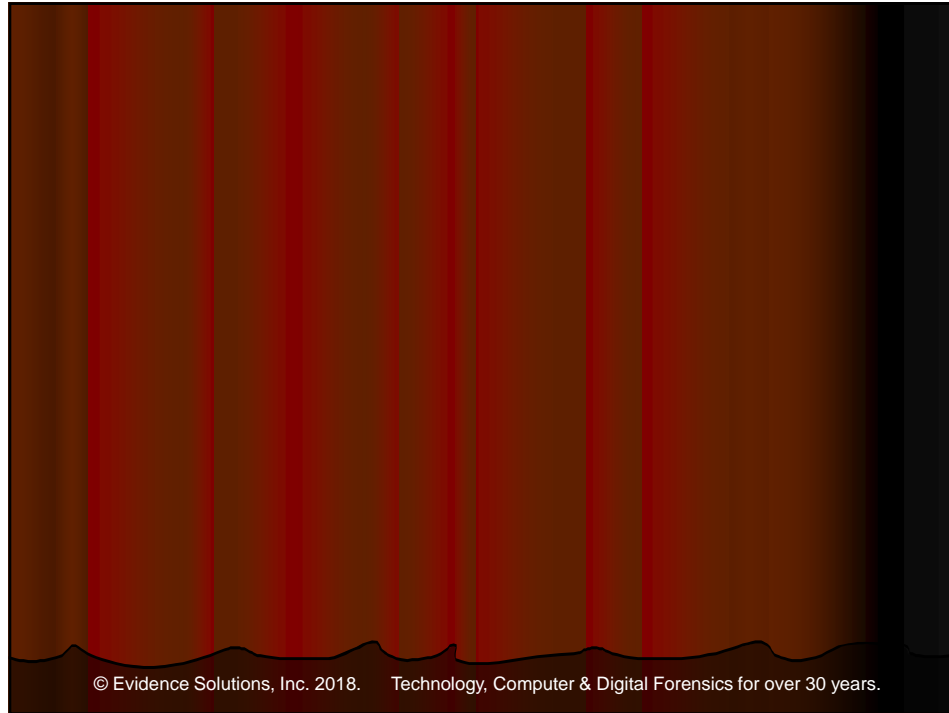
- Toll booths certainly tell a tale.
  - Smart Toll booths / near field communication
- OnStar
  - Currently only tracks your location when you call or are in an accident
  - They know your GPS coordinates

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## What potential trail have left behind?

- Two way GPS navigation systems
  - Know your GPS coordinates
  - Even one way GPS systems can learn your habits and predict your route
- Buy gas with your fast pass
- Drug register-less purchase ( RFID )

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## Black Boxes / EDR



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## Black Boxes / EDR

- Automobile Black Boxes
  - Nearly all vehicles with an air bag have a crash recorder.
  - GM was the first to allow access to EDR data
  - GM vehicles after model year 1990 will become harvestable.
  - In 2002 Ford followed suit by allowing access to some models
  - Other manufacturers also have black boxes capable of recording crash data but have not yet provided the codes needed to interpret the information.

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## Black Boxes / EDR

- **What data can Automobile Black Boxes collect?**
- **Seconds Vehicle Engine Percent Brake Switch**
- **Before Deployment Speed (mph) Speed (RPM) Throttle Circuit Status**

Seconds	Speed	RPM	Throttle	Brake
-5	57	4032	100	OFF
-4	65	4160	70	OFF
-3	62	2304	2	ON
-2	55	1088	2	ON
-1	47	896	2	ON

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## Black Boxes / EDR

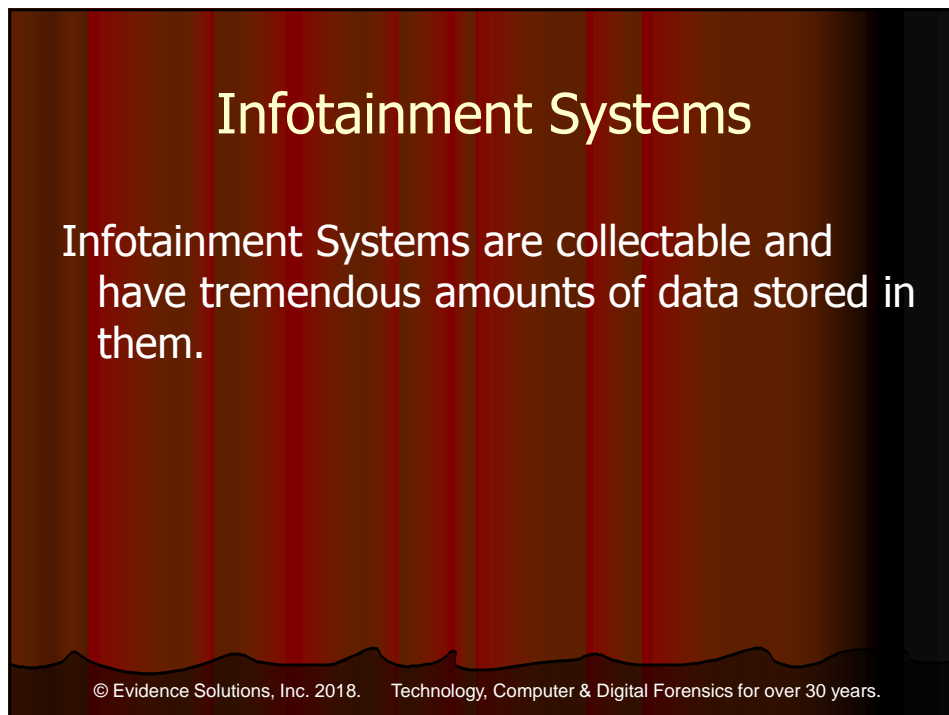
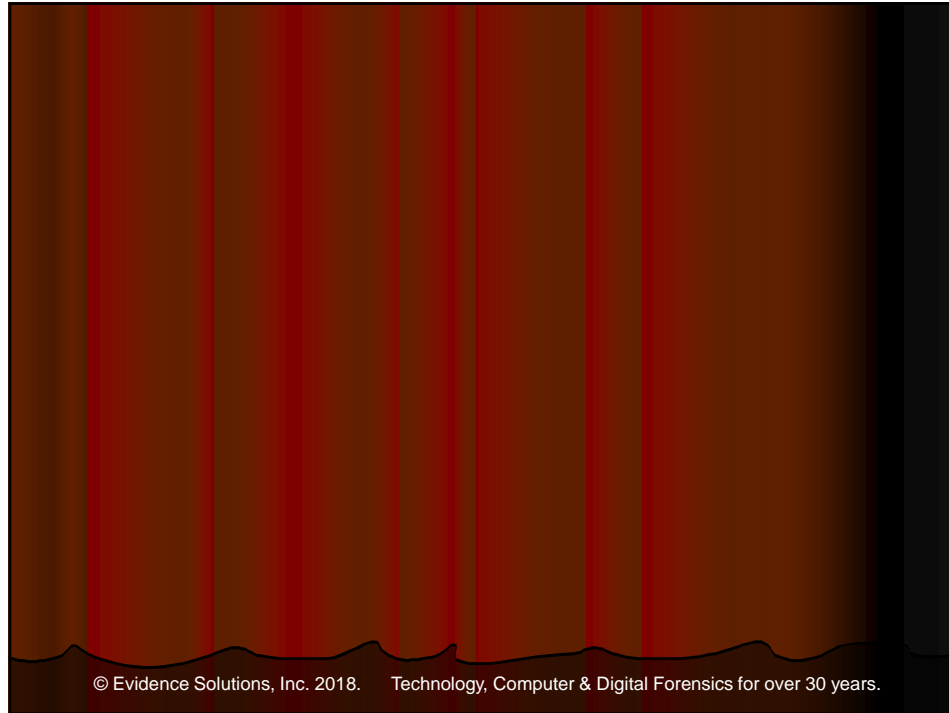
- **Automobile Black Boxes**
  - Approximately 35% of all private passenger vehicles on the highway have black box data that is harvestable. Therefore, in two vehicle accidents there is now about a 70% chance that one of the two vehicles has harvestable data.

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<b>Event Data (Event Record 1)</b>	
Event Recording Complete	Yes
Event Record Type	Deployment
Crash Record Locked	Yes
OnStar Deployment Status Data Sent	Yes
OnStar SDM Recorded Vehicle Velocity Change Data Sent	Yes
Deployment Event Counter	1
Event Counter	1
OnStar Notification Event Counter	1
Algorithm Active: Rear	No
Algorithm Active: Rollover	No
Algorithm Active: Side	Yes
Algorithm Active: Frontal	Yes
Ignition Cycles At Event	5080
Time Between Events (sec)	Data Not Available
Concurrent Event Flag Set	No
Event Severity Status: Rollover	No
Event Severity Status: Rear	No
Event Severity Status: Right Side	No
Event Severity Status: Left Side	No
Event Severity Status: Frontal Stage 2	Yes
Event Severity Status: Frontal Stage 1	Yes
Event Severity Status: Frontal Pretensioner	Yes
Driver 1st Stage Deployment Loop Commanded	Yes
Passenger 1st Stage Deployment Loop Commanded	Yes
Driver 2nd Stage Deployment Loop Commanded	Yes
Passenger 2nd Stage Deployment Loop Commanded	Yes
Driver Pretensioner Deployment Loop #1 Commanded	Yes


Left Row 2 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Right Row 2 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Left Row 3 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Right Row 3 Roof Rail/Head Curtain Loop Commanded (If Equipped)	No
Driver Knee Deployment Loop Commanded (If Equipped)	No
Passenger Knee Deployment Loop Commanded (If Equipped)	No
Left Row 2 Pretensioner Deployment Loop Commanded	No
Right Row 2 Pretensioner Deployment Loop Commanded	No
Center Row 2 Pretensioner Deployment Loop Commanded (If Equipped)	No
Battery Cutoff Loop Commanded (If Equipped)	No
Driver Roll Bar Loop Commanded (If Equipped)	No
Passenger Roll Bar Loop Commanded (If Equipped)	No
Steering Column Energy Absorbing Loop Commanded (If Equipped)	No
Driver Head Rest Loop Commanded (If Equipped)	No
Passenger Head Rest Loop Commanded (If Equipped)	No
Left Row 2 Head Rest Loop Commanded (If Equipped)	No
Right Row 2 Head Rest Loop Commanded (If Equipped)	No
Center Row 2 Head Rest Loop Commanded (If Equipped)	No
Driver Belt Switch Circuit Status	Buckled
Passenger Belt Switch Circuit Status	Buckled
Passenger Seat Occupancy Status	Occupied
Passenger Classification Status	Small Adult
Passenger Air Bag ON Indicator Status	On
Passenger Air Bag OFF Indicator Status	Off
Low Tire Pressure Warning Lamp	Off
SIR Warning Lamp Status	Off
SIR Warning Lamp ON/OFF Time Continuously (seconds)	655330
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	650
Ignition Cycles Since DTCs Were Last Cleared at Event Enable	253






# Infotainment Systems

## INFORMATION




**Connected Devices**

Identify devices that have been connected to a vehicle via Wi-Fi, Bluetooth and/or USB, and all of the data associated with those devices



**Location Data**

Recover location data and navigation information such as tracklogs, saved locations, active routes and previous destinations



**Vehicle Events**

See events associated with a vehicle such as doors opening/closing, lights turning on/off, locations and timestamps

BERLA

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# Infotainment Systems

- Location / GPS
- Automated functions
  - Lane keeping
  - AEB – Automatic Emergency Braking
- Communications Data
  - SMS / Text Messages
  - Email
  - Call Logs

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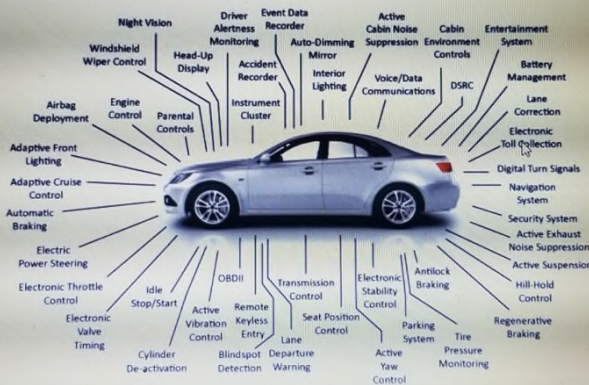
# Infotainment Systems

- Radio
  - Station
  - Volume
  - Etc
- Lights
  - Interior
  - Exterior
- Parental and Valet Controls

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# Infotainment Systems

## DATA SOURCES



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## Key Fobs

- BMW, Audi & Others
  - VIN
  - Vehicle Mileage
  - Last time in vehicle
  - Fuel Level
  - Engine Temperature
  - Outside Temperature
  - Battery Voltage
  - And More!

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## Truck Black Boxes

- AKA:
  - Engine Control Unit (ECU)
  - Engine Control Module (ECM)
  - Black Box

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## Truck Black Boxes

Truck Black boxes have become increasingly sophisticated over time. Newer modern devices have a tremendous amount of memory.

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# Truck Case Examples

Commercial Truck Driver  
Driving in the oil fields in Texas  
On for an hour off for an hour

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# Sample Truck Data

**DDEC® Reports - Trip Activity**  
Print Date: Jan 19, 2012 10:24 AM (EST)

		Trip: 10/11/10 07:20 AM (EST) to 10/25/10 (EST)	
		Vehicle ID: 56405	
		Driver ID:	
		Odometer: 153282.8 mi	
Trip Distance	8767.4 mi	Trip Time	157:00:42
Trip Fuel	1217.50 gal	Fuel Consumption	7.75 gal/h
Fuel Economy	7.20 mpg	Idle Time	12:11:53
Avg Drive Load	48 %	Idle Percent	7.77 %
Avg Vehicle Speed	60.5 mph	Idle Fuel	5.63 gal
		Parked Regen Time	0:00:00
Driving Time	144:48:49	Stop Idle Time	3:53:48
Driving Percent	92.28 %	Stop Idle Percent	2.48 %
Driving Fuel	1211.88 gal	Stop Idle Fuel	1.50 gal
Driving Economy	7.23 mpg		
Vehicle Speed Limiting		Over Rev Limit	1800 rpm
Time	71:34:21	Count	0
Percent	49.42 %	Time	0:00:00
Distance	4675.4 mi	Percent	0.00 %
Fuel	374.88 gal	Highest RPM	2134 rpm
Top Gear		Occurred	10/20/10 19:20:54 (EST)
Time	127:50:19	Diag. Records	0
Percent	88.28 %	Hard Brake Count	0
Distance	8212.4 mi	Firm Brake Count	31
Fuel	1088.50 gal	Brake Count	1286
		Eng. Brake Time	0:01:49

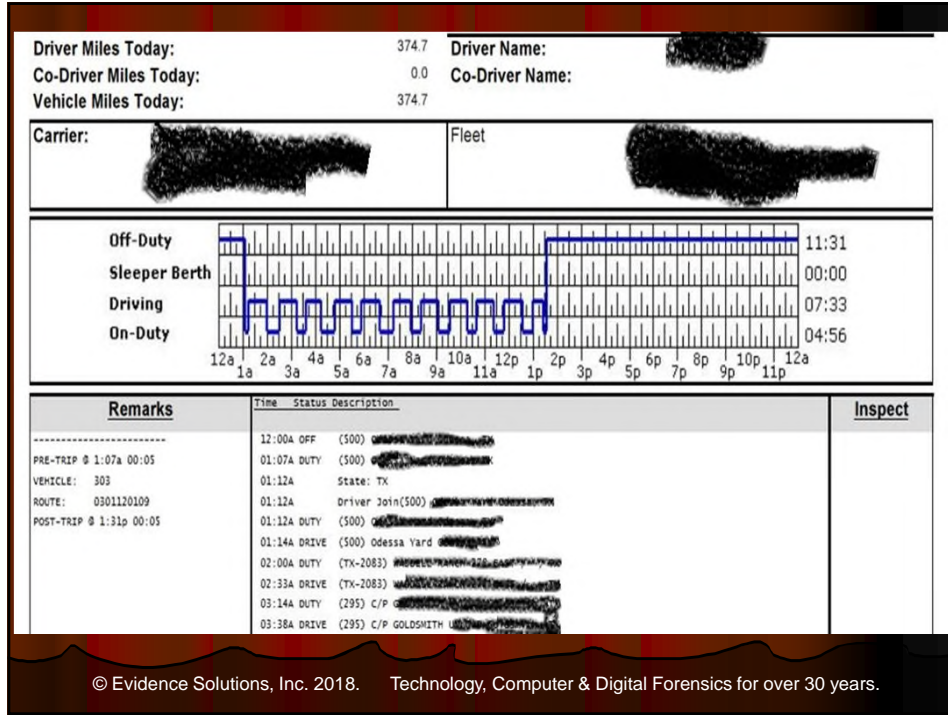
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# Sample Truck Data

Top Gear - 1		Fan On Time	
Time	6:38:00	Total Time	1:57:06
Percent	4.58 %	Engine System	0:00:00
Distance	368.2 mi	Manual	0:00:00
Fuel	80.63 gal	A/C	1:57:06
Cruise		DPF Fan Time	0:00:00
Time	98:00:48	Engine Utilization	46.74 %
Percent	67.68 %	Vehicle Utilization	43.11 %
Distance	6301.5 mi	DPF Regeneration	
Fuel	857.50 gal	Parked Completed	0
Top Gear Cruise		Driving Completed	2
Time	94:54:36	Parked Regen Fuel	0.00 gal
Percent	65.54 %	Driving Regen Fuel	3.67 gal
Distance	6127.7 mi	Diesel Exhaust Fluid (DEF)	
Fuel	815.75 gal	Trip Fluid	29.26 gal
Speeding A (>=66 mph and <71 mph)		Trip Percent	2.40 %
Count	3215	Trip Economy	299.65 mpg
Time	14:39:41	Driving Fluid	
Percent	10.12 %	Driving Economy	302.11 mpg
Speeding B (>=71 mph)		Optimized Idle Time	
Count	188	Active	0:00:00
Time	0:48:08	Run	0:00:00
Percent	0.55 %	Battery	0:00:00
Highest Speed		Engine Temp.	0:00:00
Occurred	10/13/10 22:32:30 (EST)	Thermostat	0:00:00
Coasting Time		Extended Idle	0:00:00
Coasting Percent	0.00 %	Continuous	0:00:00

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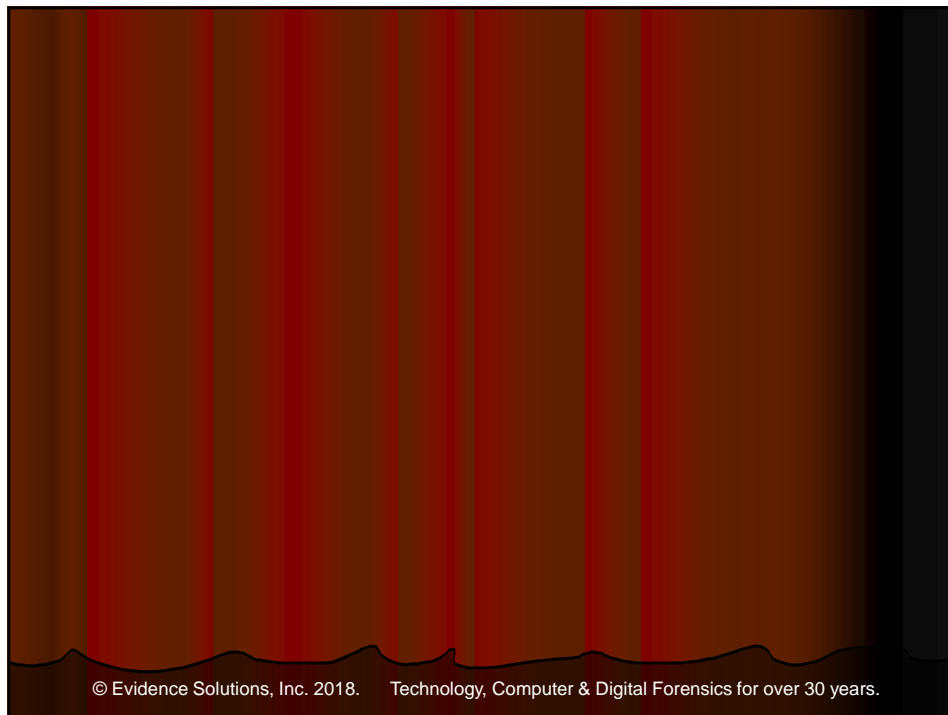


Time	Status	Description
12:00A	OFF	(500)
01:07A	DUTY	(500)
01:12A		State: TX
01:12A		Driver
01:12A	DUTY	(500)
01:14A	DRIVE	(500)
02:00A	DUTY	(TX-2083)
02:33A	DRIVE	(TX-2083)
03:14A	DUTY	(295) C/P
03:38A	DRIVE	(295) C/P
04:16A	DUTY	(TX-2083)
04:50A	DRIVE	(TX-2083)
05:32A	DUTY	(295) C/P
05:57A	DRIVE	(295) C/P
06:42A	DUTY	(TX-2083)
07:16A	DRIVE	(TX-2083)
07:59A	DUTY	(295) C/P
08:23A	DRIVE	2.7 mi S of
09:05A	DUTY	(TX-4198)
09:35A	DRIVE	(TX-4198)
10:18A	DUTY	(295) C/P
10:42A	DRIVE	(295) C/P
11:25A	DUTY	(TX-4196)
11:52A	DRIVE	12.8 mi NW
12:35P	DUTY	(295) C/P
01:01P	DRIVE	(295) C/P
01:28P	DUTY	(500)
01:31P		Driver Leave(500)
01:31P	DUTY	(500)
01:36P	OFF	(500)

03/01/12 0709	SMS - Inbox	
03/01/12 0710	SMS - Inbox	
03/01/12 0716	Driving	
03/01/12 0735	SMS - Sent	Terra
03/01/12 0737	SMS - Inbox	Terra
03/01/12 0738	SMS - Sent	Terra
03/01/12 0739	SMS - Inbox	
03/01/12 0759	In Service	
03/01/12 0823	Driving	
03/01/12 0842	SMS - Sent	N8
03/01/12 0905	In Service	
03/01/12 0935	Driving	
03/01/12 0955	SMS - Inbox	N/A
03/01/12 1018	In Service	
03/01/12 1042	Driving	
03/01/12 1125	In Service	
03/01/12 1152	Driving	
03/01/12 1230	SMS - Inbox	N/A
03/01/12 1235	In Service	
03/01/12 1240	SMS - Inbox	

- The following represents the approximate number of text messages sent by Defendant while he was driving his tractor-trailer.



# Bytes Per Minute Analysis

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1329977.002  
06/12/2013  
SCAMP

**MOBILITY USAGE**

Run Date: 06/12/2013  
Run Time: 17:41:35  
Voice Usage For: (480) [REDACTED]  
Account Number: 81342 [REDACTED]

Item	Conn. Date	Conn. Time	Seizure Time	Originating Number	Terminating Number	Elapsed Time	Number Dialed	IMEI	IMSI	Descriptio
1	01/01/11	05:36A	0:22	[REDACTED]	[REDACTED]	0:00	[REDACTED]	35349104165148	310410366057466	m2M_DIR
2	01/01/11	05:37A	0:02	[REDACTED]	[REDACTED]	0:06	[REDACTED]		310410366057466	M2m
3	01/01/11	05:37A	0:27	[REDACTED]	[REDACTED]	0:06	[REDACTED]		310410366057466	m2M
4	01/01/11	09:09A	0:10	[REDACTED]	[REDACTED]	4:42	[REDACTED]	35349104165148	310410366057466	m2M_DIR
5	01/01/11	09:31A	0:08	[REDACTED]	[REDACTED]	3:22	[REDACTED]	35349104165148	310410366057466	m2M_DIR
6	01/01/11	09:35A	0:05	[REDACTED]	[REDACTED]	1:05	[REDACTED]	35349104165148	310410366057466	M2O_DIR
7	01/01/11	09:38A	0:05	[REDACTED]	[REDACTED]	0:47	[REDACTED]	35349104165148	310410366057466	M2O_DIR
8	01/01/11	09:40A	0:23	[REDACTED]	[REDACTED]	0:06	[REDACTED]	35349104165148	310410366057466	M2O_DIR
9	01/01/11	09:42A	0:08	[REDACTED]	[REDACTED]	0:31	[REDACTED]	35349104165148	310410366057466	M2O_DIR
10	01/01/11	09:45A	0:01	[REDACTED]	[REDACTED]	0:00	[REDACTED]	35349104165148	310410366057466	M2O_DIR

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MOBILITY USAGE

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Item	Conn. Date	Conn. Time	Seizure Time	Originating Number	Terminating Number	Elapsed Time	Number Dialed
1	01/01/11	05:36A	0:22	[REDACTED]	[REDACTED]	0:00	[REDACTED]
2	01/01/11	05:37A	0:02	[REDACTED]	[REDACTED]	0:06	[REDACTED]
3	01/01/11	05:37A	0:27	[REDACTED]	[REDACTED]	0:06	[REDACTED]
4	01/01/11	09:09A	0:10	[REDACTED]	[REDACTED]	4:42	[REDACTED]
5	01/01/11	09:31A	0:08	[REDACTED]	[REDACTED]	3:22	[REDACTED]
6	01/01/11	09:35A	0:05	[REDACTED]	[REDACTED]	1:05	[REDACTED]
7	01/01/11	09:38A	0:05	[REDACTED]	[REDACTED]	0:47	[REDACTED]
8	01/01/11	09:40A	0:23	[REDACTED]	[REDACTED]	0:06	[REDACTED]
9	01/01/11	09:42A	0:08	[REDACTED]	[REDACTED]	0:31	[REDACTED]
10	01/01/11	09:45A	0:01	[REDACTED]	[REDACTED]	0:00	[REDACTED]

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1329977.002  
06/12/2013  
SCAMP

MOBILITY USAGE

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Run Date: 06/12/2013  
Run Time: 17:42:47  
Data Usage For: (480) [REDACTED]  
Account Number: 81342 [REDACTED]

Item	Conn. Date	Conn. Time	Originating Number	Elapsed Time	Bytes Up	Bytes Dn	IMEI	IMSI	Access Pt	Description
6374	05/26/11	10:00A	[REDACTED]	13:13	6677	111991	3534910416514804	310410366057466	acds.voicemai	_MOBILE_DATA_
6375	05/26/11	10:14A	[REDACTED]	5:08	0	0	3534910416514804	310410366057466	acds.voicemai	_MOBILE_DATA_
6376	05/26/11	10:31A	[REDACTED]	13:14	9271	49317	3534910416514804	310410366057466	BLACKBERRY.NE	_MOBILE_DATA_
6377	05/26/11	10:31A	[REDACTED]	2:13	2639	8417	3534910416514804	310410366057466	WAP.CINGULAR	_MOBILE_DATA_
6378	05/26/11	10:44A	[REDACTED]	0:24	553	571	3534910416514804	310410366057466	BLACKBERRY.NE	_MOBILE_DATA_

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1329977.002  
06/12/2013  
SCAMP

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Run Date: 06/12/2013  
Run Time: 17:42:47  
Data Usage For: (480) [REDACTED]  
Account Number: 81342 [REDACTED]

Item	Conn. Date	Conn. Time	Originating Number	Elapsed Time	Bytes Up	Bytes Dn
6374	05/26/11	10:00A	[REDACTED]	13:13	6677	111991
6375	05/26/11	10:14A	[REDACTED]	5:08	0	0
6376	05/26/11	10:31A	[REDACTED]	13:14	9271	49317
6377	05/26/11	10:31A	[REDACTED]	2:13	2639	8417
6378	05/26/11	10:44A	[REDACTED]	0:24	553	571

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1329977.002  
06/12/2013  
SCAMP

MOBILITY USAGE

---

Run Date: 06/12/2013  
Run Time: 17:44:11  
SMS Usage For: (480) [REDACTED]  
Account Number: 81342 [REDACTED]

Item	Conn. Date	Conn. Time	Originating Number	Terminating Number	IMEI	IMSI	Description
913	01/14/11	09:37P	[REDACTED]5660	[REDACTED]3109	35349104165148	310410366057466	OUT
914	01/14/11	09:37P	[REDACTED]5660	[REDACTED]3109	35349104165148	310410366057466	OUT
915	01/14/11	09:41P	[REDACTED]3109	[REDACTED]5660	35349104165148	310410366057466	IN
916	01/15/11	08:06A	[REDACTED]5660	[REDACTED]3587	35349104165148	310410366057466	OUT
917	01/15/11	08:16A	[REDACTED]3587	[REDACTED]5660	35349104165148	310410366057466	IN
918	01/15/11	08:32A	[REDACTED]5660	[REDACTED]3587	35349104165148	310410366057466	OUT
919	01/15/11	08:32A	[REDACTED]3587	[REDACTED]5660	35349104165148	310410366057466	IN

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Bytes	Up Bytes	Down Bytes	Start Time	Stop Time	Minutes & Seconds	Minutes Decimal	Bytes Up Per Minute	Bytes Down Per Minute
252142	802050	20:30:51	21:21:04	0:50:13	50.22	5021.1	15971.79	
49464	160970	21:21:04	21:25:15	0:04:11	4.18	11824.1	38478.88	
71829	150196	21:24:39	21:29:17	0:04:38	4.63	15502.7	32416.40	
93798	474706	21:29:17	21:31:50	0:02:33	2.55	36783.5	186159.22	
5417	23189	21:31:50	21:32:14	0:00:24	0.40	13542.5	57972.50	
72626	201117	21:32:14	21:36:11	0:03:57	3.95	18386.3	50915.70	
5190	9100	21:36:11	21:37:06	0:00:55	0.92	5661.8	9927.27	
6368	2592	21:36:47	21:37:54	0:01:07	1.12	5702.7	2321.19	
126797	265200	21:37:34	21:46:12	0:08:38	8.63	14686.9	30718.15	
1114	1373	21:46:12	21:46:48	0:00:36	0.60	1856.7	2288.33	
18846	35183	21:46:29	21:47:38	0:01:09	1.15	16387.8	30593.91	
163366	331681	21:47:18	22:02:19	0:15:01	15.02	10879.0	22087.52	
30126	155700	22:02:19	22:03:47	0:01:28	1.47	20540.5	106159.09	
1161	2429	22:03:40	22:04:06	0:00:26	0.43	2679.2	5605.38	
63929	205988	22:03:47	22:06:35	0:02:48	2.80	22831.8	73567.14	
21200	42132	22:06:35	22:08:14	0:01:39	1.65	12948.5	25344.55	
16559	23450	22:07:54	22:09:42	0:01:48	1.80	9199.4	13027.79	
164656	833466	22:09:22	22:13:21	0:03:59	3.98	41336.2	209238.33	
4220	4079	22:13:21	22:14:04	0:00:43	0.72	5888.4	5691.6	
6789	15878	22:14:04	22:15:01	0:00:57	0.95	7146.3	16713.68	
2591	2953	22:15:01	22:17:38	0:02:37	2.62	990.2	1128.54	
1326	850	22:17:38	22:18:37	0:00:59	0.98	1348.5	864.41	
60800	202695	22:18:37	22:42:32	0:23:55	23.92	2542.2	8475.05	

1,240,314 3,946,978 12329.8 41124.2 298.33% 452.68%

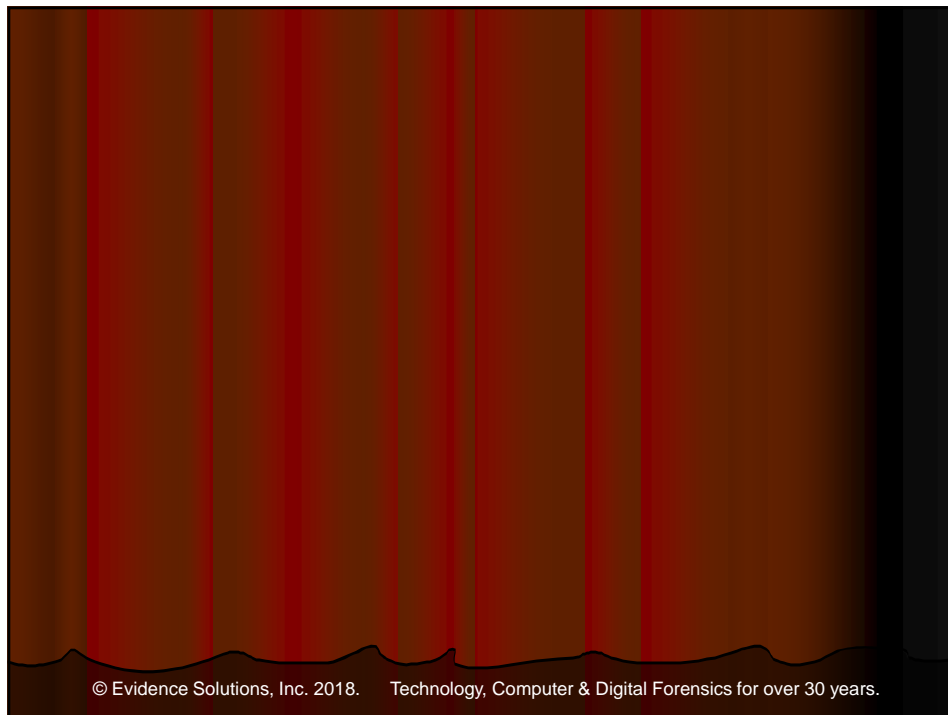
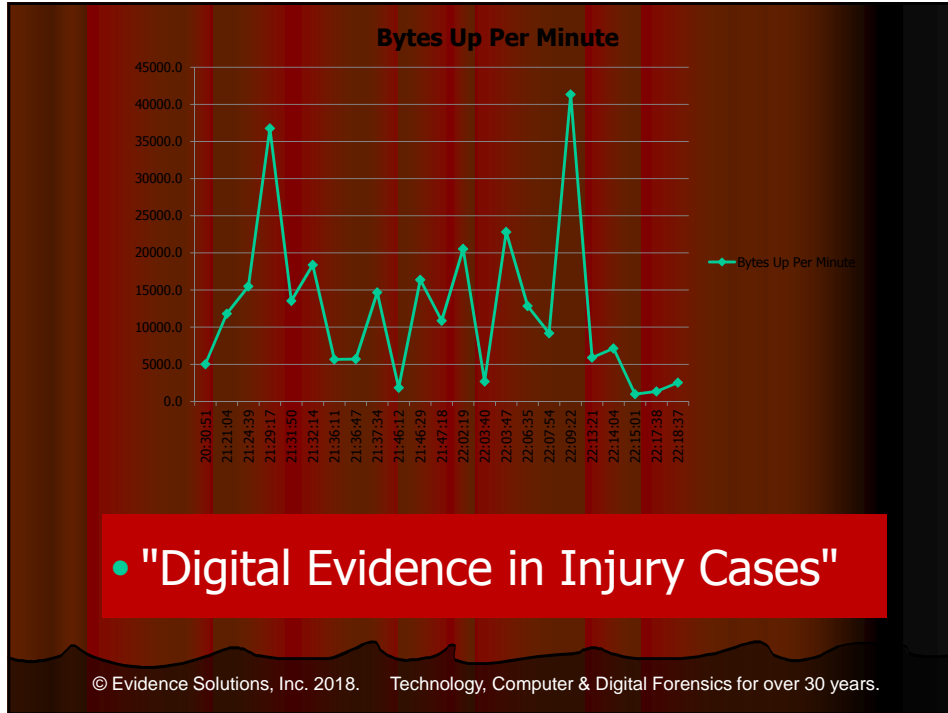
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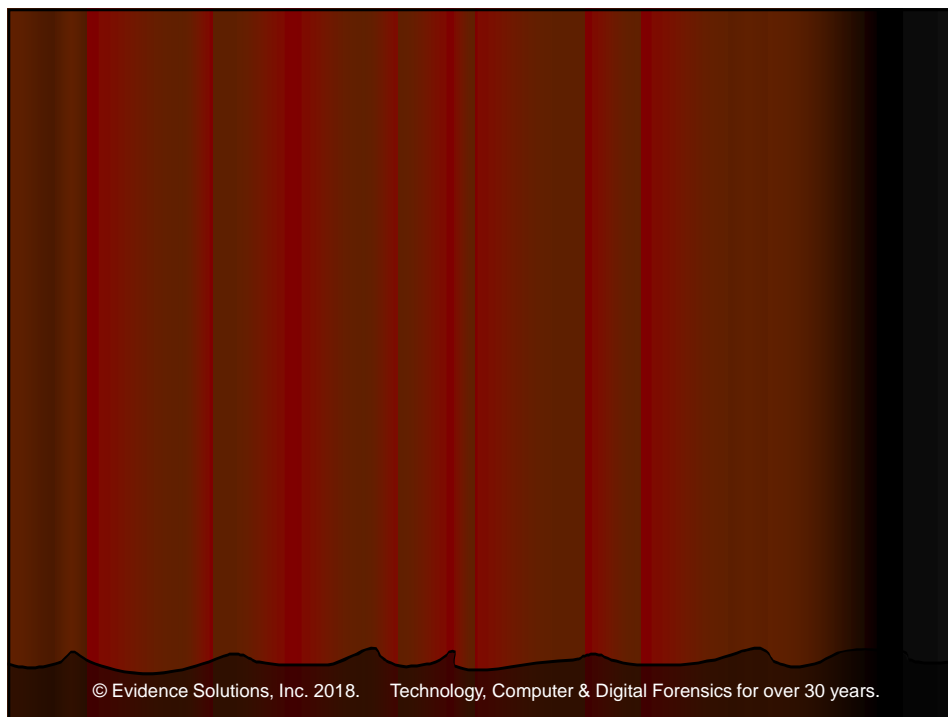
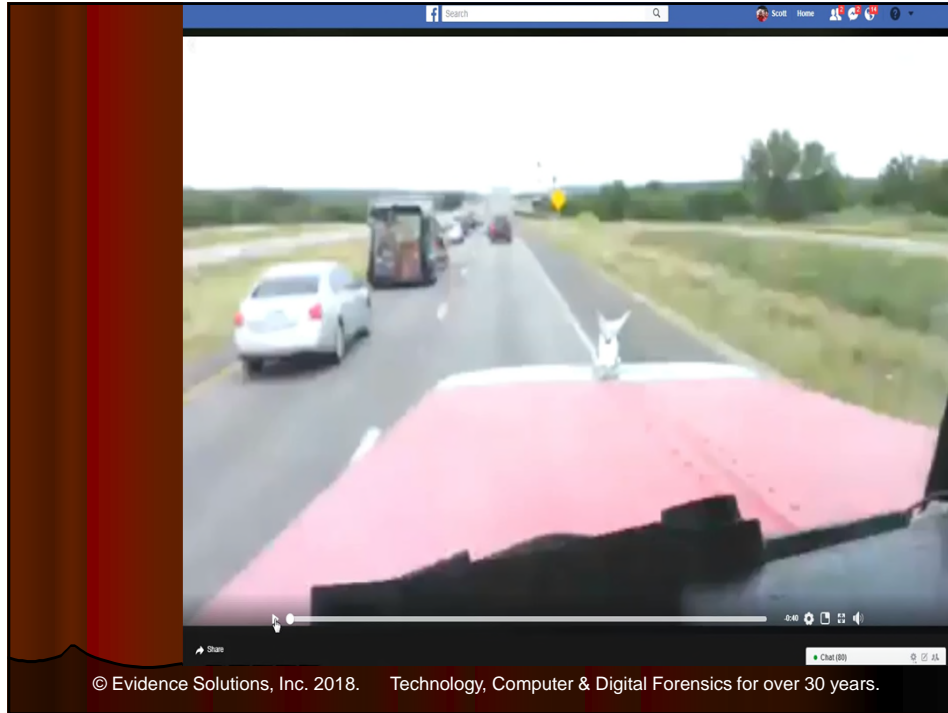


877	sex quotes for her - Google Search	https://www.google.com/search?q=sex+qu otes+for+her&client=safari&hl=en- us&prmd=ivn&source=inms&ibm=isch&sa =X&ved=0ahUKEwiA8OvKobzOAhVH2ZM KHU15Ao0Q_AUIBygB&bw=375&bh=559 #tbn=isch&itbs=rimg%3AC24_1IQSmLWY kAmR50f8rqBWrjOzE0U5xdIF5nB YmpD 9wN0V55sM4k2SW0DvvyQBSBx31BW Hos HBL_1NMPPhA7D2Q5pLrKhUJkedH_1K0 sQURMR4OuAYQAqEgIqizsNleRFa uqISPm4NHioSCxSBeYQWJqQEeT28s DHvvyKhUJ_1bsDfFebDMR3qNRL V44aoqEgmG9kjn9L78hEHYZaDSKLWIS oSCUAUgcY99QVhEX02SgnlQuAokhJ6 LPs L12TDORQDTrZjgH6f9EgipA0w9kOaS6x Ek7I26VKmapQ%3D%3D&f=sex%20quot es%20for%20her&hl=en-us	8/12/2016 11:25:07 AM(UTC- 5)	1	Safari	
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## Electronic Logging Devices ( ELDs)

- ELDs must be installed and in use by the December 16, 2017 deadline which is two years after the publication date. The mandate applies to all drivers who are required to keep records of duty status, except commercial drivers who 1) drive eight or fewer days out of every 30 working days; 2) drivers in drive-away and towing operations and 3) operators who are driving vehicles older than model year 2000.

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## Electronic Logging Devices ( ELDs)

- ELDs must be able to automatically record date, time and location information. Location will generally be in the form of GPS coordinates, but GPS is not required. It also must record engine hours which must be synchronized from the engine on and off time. Finally, the vehicle miles and driver identification information must be logged.

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# Electronic Logging Devices ( ELDs)

- The rule also requires compliant devices to be able to transfer data during roadside inspections. Acceptable interfaces to supply the data include: email, USB, Bluetooth, or a wireless Web-based services. In addition, ELDs must be able to display a graphic representation of the driver's daily duty status changes. This must be generated either on the screen of the unit or available in a printout.

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DATE/TIME	LATITUDE	LONGITUDE	ADDRESS	STATUS	SPEED
12/2/2017 23:49	28.9311353	-97.878644	Unnamed Road, Karnes City, US-TX, 78118, USTexas, US 1BELLAH UNIT 1H289296797888VANTA BEN 1BELLAH UNIT 1H	STOPPED	0
12/2/2017 22:49	28.9311593	-97.8786371	Unnamed Road, Karnes City, US-TX, 78118, USTexas, US 1BELLAH UNIT 1H289296797888VANTA BEN 1BELLAH UNIT 1H	STOPPED	0
12/2/2017 21:49	28.9311635	-97.8786508	Unnamed Road, Karnes City, US-TX, 78118, USTexas, US 1BELLAH UNIT 1H289296797888VANTA BEN 1BELLAH UNIT 1H	STOPPED	0
12/2/2017 20:50	28.9311575	-97.878655	Unnamed Road, Karnes City, US-TX, 78118, USTexas, US 1BELLAH UNIT 1H289296797888VANTA BEN 1BELLAH UNIT 1H	STOPPED	0
12/2/2017 20:49	28.9311478	-97.879475	Unnamed Road, Karnes City, US-TX, 78118, USTexas, US 128929679787888	MOVING	8
12/2/2017 20:49	28.9309203	-97.8783275	Unnamed Road, Karnes City, US-TX, 78118, USTexas, USVANTA BEN 1BELLAH UNIT 1H289296797888 1BELLAH UNIT 1H	MOVING	8
12/2/2017 20:48	28.930165	-97.8793593	Unnamed Road, Karnes City, US-TX, 78118, USTexas, USVANTA BEN 1BELLAH UNIT 1H289296797888 1BELLAH UNIT 1H	MOVING	15
12/2/2017 20:48	28.9291831	-97.8803348	Unnamed Rd, Karnes City, US-TX, 78118, USTexas, US GHROOS UNIT 1H289296797888ROOS UNIT 1H 1	MOVING	21
12/2/2017 20:47	28.9238186	-97.8803348	County Road 354, Karnes City, US-TX, 78118, USTexas, US410 NABORS DRILLING/PLEAPDR UNIT 2MPDR UNIT 1H	MOVING	23
12/2/2017 20:46	28.9184991	-97.8803435	County Road 354, Karnes City, US-TX, 78118, USTexas, US	MOVING	22
12/2/2017 20:45	28.9112131	-97.8803008	County Road 354, Karnes City, US-TX, 78118, USTexas, US410 NABORS DRILLING/PLEAPDR UNIT 2MPDR UNIT 1H	MOVING	32
12/2/2017 20:44	28.9023355	-97.8803008	County Road 354, Karnes City, US-TX, 78118, USTexas, US	MOVING	32
12/2/2017 20:43	28.9036583	-97.8905415	Texas Rd, Karnes City, US-TX, 78118, USTexas, US	MOVING	54
12/2/2017 20:42	28.8901366	-97.8929515	800-918 Muecke Dr, Karnes City, US-TX, 78118, USTexas, US	MOVING	36
12/2/2017 20:41	28.8806961	-97.8932118	798 Louise St, Karnes City, US-TX, 78118, USTexas, US	MOVING	43
12/2/2017 20:40	28.8694326	-97.8933246	615 County Road 358, Karnes City, US-TX, 78118, USTexas, US	MOVING	40
12/2/2017 20:24	28.8655738	-97.894524	U.S. 181 Business, Karnes City, US-TX, 78118, USTexas, US	STOPPED	0
12/2/2017 20:23	28.86661	-97.894646	U.S. 181 Business, Karnes City, US-TX, 78118, USTexas, US	MOVING	12
12/2/2017 20:22	28.8756971	-97.893311	Unnamed Road, Karnes City, US-TX, 78118, USTexas, US	MOVING	52
12/2/2017 20:21	28.884212	-97.893305	TX-80, Karnes City, US-TX, 78118, USTexas, US	MOVING	9
12/2/2017 19:50	28.8842091	-97.8933051	TX-80, Karnes City, US-TX, 78118, USTexas, US	STOPPED	1
12/2/2017 19:49	28.8821598	-97.8932161	201 U.S. 181 Business, Karnes City, US-TX, 78118, USTexas, US	MOVING	31
12/2/2017 19:48	28.8706323	-97.8933028	U.S. 181 Business, Karnes City, US-TX, 78118, USTexas, US	MOVING	50
12/2/2017 19:47	28.8590715	-97.8933085	U.S. 181, Karnes City, US-TX, 78118, USTexas, US	MOVING	57
12/2/2017 19:46	28.8401536	-97.879 N Sunset Strip St,	Karnes City, US-TX, 78118, USTexas, US	MOVING	55
12/2/2017 19:45	28.8384468	-97.8705848	N Sunset Strip St, Kennedy, US-TX, 78119, USTexas, US 12893899786883	MOVING	52
12/2/2017 19:44	28.8339565	-97.8674318	North Sunset Strip Street, Karnes City, US-TX, 78118, USTexas, US	MOVING	45
12/2/2017 19:43	28.8260728	-97.8596706	333 N Sunset Strip St, Kennedy, US-TX, 78119, USTexas, US	MOVING	47
12/2/2017 19:42	28.8173655	-97.8575211	W Live Oak St, Kennedy, US-TX, 78119, USTexas, US	MOVING	10
12/2/2017 19:26	28.816913	-97.8570135	117 Craig St, Kennedy, US-TX, 78119, USTexas, US	STOPPED	0
12/2/2017 19:25	28.8174431	-97.8567435	117 Craig St, Kennedy, US-TX, 78119, USTexas, US	MOVING	8
12/2/2017 19:24	28.8173436	-97.8573695	W Live Oak St, Kennedy, US-TX, 78119, USTexas, US	MOVING	10
12/2/2017 19:23	28.8126576	-97.8600055	238 TX-72, Kennedy, US-TX, 78119, USTexas, US	MOVING	39

## There is only one problem

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569 03/17 11:35:05 [Workflow:WorkflowLoaderApplication,INF] WorkflowEngineImpl: getting initial position from GPSServer -
lat/long = 33.6043510437017/-86.2662811279297
570 03/17 11:35:05 [WorkflowLocationService:WorkflowLoaderApplication,CRI] WorkflowLocationService Tracelevel Settings
traceConfig:Critical,traceLevel:Critical
571 03/17 11:35:05 [WorkflowLocationService:WorkflowLoaderApplication,INF] LocationServiceImpl: Initialize(): starting
init.
572 03/17 11:35:05 [WorkflowLocationService:WorkflowLoaderApplication,INF] LocationServiceImpl: Update timer started,
interval = 10000 ms.
573 03/17 11:35:05 [Workflow:WorkflowLoaderApplication,INF] WorkflowEngineImpl: Hulk engine Initialize success...
574 03/17 11:35:05 [WorkflowLoaderApplication:WorkflowLoaderApplication,INF] HulkEngineManager: Static Hulk engine
s_Engine initialized.
575 03/17 11:35:05 [WorkflowLoaderApplication:WorkflowLoaderApplication,INF]
WorkflowLoaderApplication::DoInitialization(): static Hulk engine created.
576 03/17 11:35:05 [WorkflowLoaderApplication:WorkflowLoaderApplication,INF] WorkflowLoaderApplication state changed from
Initializing to Initialized.
577 03/17 11:35:05 [PositionReporting:PositionReporting,INF] PositionReporting state changed from Initializing to
Initialized.
578 03/17 11:35:05 [PositionReporting:PositionReporting,INF] Initialized PositionReporting thread id 0x0981000E!
579 03/17 11:35:05 [WorkflowLocationService:,INF] In LocationServiceImpl UpdateLocationState(): state updated 1:
Init->Stopped
580 03/17 11:35:05 [GpsServer:GpsServer,INF] GpsServer state changed from Initializing to Initialized.
581 03/17 11:35:05 [GpsServer:GpsServer,INF] Initialized GpsServer thread id 0x07C20142!

```

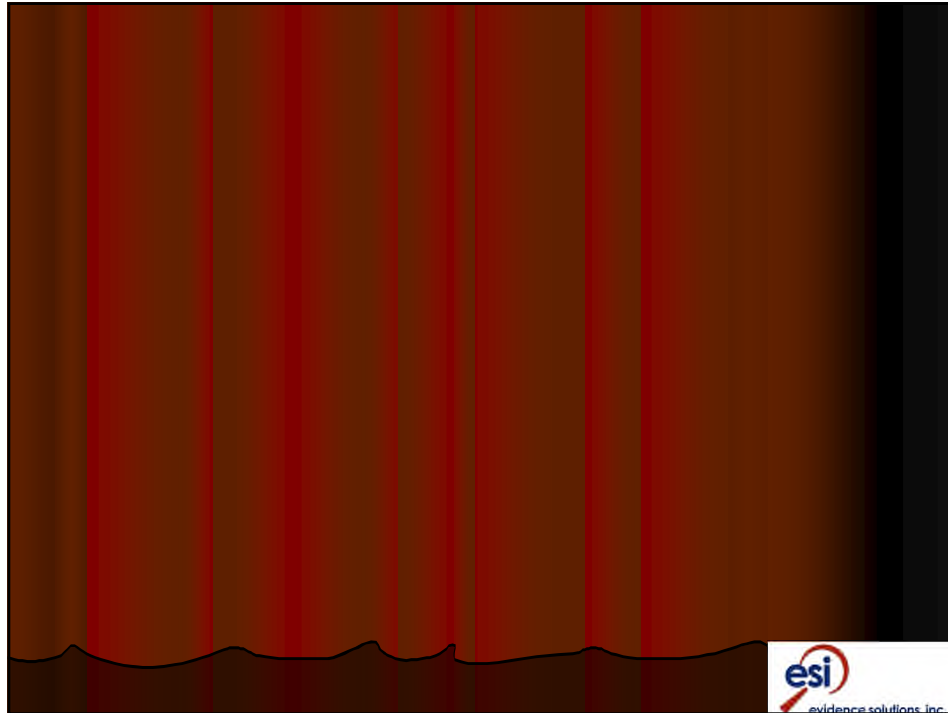
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582 03/17 11:35:06 [DriverLogin:DriverLogin,INF] ^^UpdateDriver() - Driver 'LoginId: GIBBONSDAV, SensorTracsId:
4294967295, Active: False' before update.
583 03/17 11:35:06 [DriverLogin:DriverLogin,INF] ^^UpdateDriver() - Got authentication success from NMC
584 03/17 11:35:06 [DriverLogin:DriverLogin,INF] ^^UpdateDriver() - Driver not authenticated yet. 'LoginId: GIBBONSDAV,
SensorTracsId: 4294967295, Active: False' .Propagating NMC properties to driver
585 03/17 11:35:06 [DriverLogin:DriverLogin,INF] ^^LoginSessionNMC2MT.SensorTRACsId: Before = 4294967295
586 03/17 11:35:06 [DriverLogin:DriverLogin,INF] ^^LoginSessionNMC2MT.SensorTRACsId: After = 4071977
587 03/17 11:35:06 [DriverLogin:DriverLogin,INF] ^^UpdateDriver() - Driver after update. 'LoginId: GIBBONSDAV,
SensorTracsId: 4071977, Active: False'
588 03/17 11:35:06 [ProtocolServer:ProtocolServer,INF] ProtocolServer state changed from Initializing to Initialized.
589 03/17 11:35:06 [ProtocolServer:ProtocolServer,INF] Initialized ProtocolServer thread id 0x079D011E!
590 03/17 11:35:06 [ConnectionServer:ConnectionServer,INF] ConnectionServer state changed from Initializing to
Initialized.
591 03/17 11:35:06 [DriverLogin:DriverLogin,INF] ^^UpdateDriver() - Driver 'LoginId: GROSHANTIM, SensorTracsId:
4294967295, Active: False' before update
592 03/17 11:35:07 [ConnectionServer:ConnectionServer,INF] Initialized ConnectionServer thread id 0x07990122!

```

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- Vehicle Maintenance Systems
  - Records of what happened when & by whom
- Telematics / Electronic Logging Devices
  - They aren't the end
- Self Driving / Automation in Cars
  - Safer.... eventually

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There are a number of applications that can be installed on cell phones to prevent texting and driving.

- **DriveOFF – Free**
- **DriveMode – Free**
- **TextBuster - \$179**
- **DriveScribe - Free**

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## Scott Greene: Other topics available

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- Computer Forensics for Defense Attorneys
- Personal Privacy in the Information Age
- High Technology: Just where is technology going?
- Bypassing Security: How They Steal Company Data
- Fundamentals of Digital Forensics
- Technology Forensics: Theory & Potential... is it Science or Art?
- Technology Forensics: Case Examples
- Technology Forensics: Intellectual property and identity theft
- Technology Forensics: Hardware and Software tools / Show and Tell
- Portable Devices Issues and Answers: A discussion about cell phones and the stories they can tell.
- Anti-Digital Forensics. Or is it Digital Anti-Forensics?
- Data Security and Confidentiality Issues
- E-mail: The digital Smoking Gun



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Senior Technology Examiner*

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