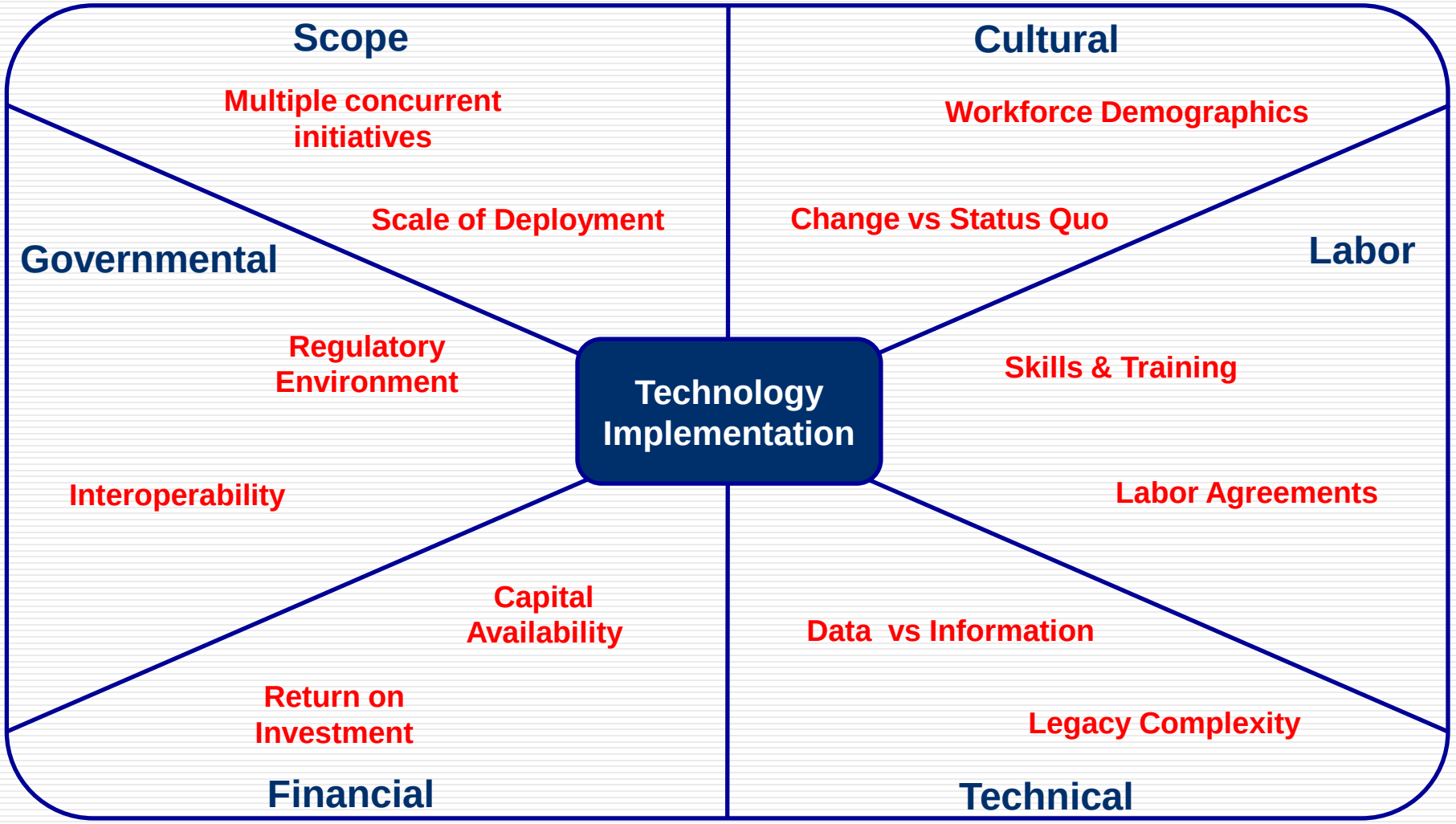
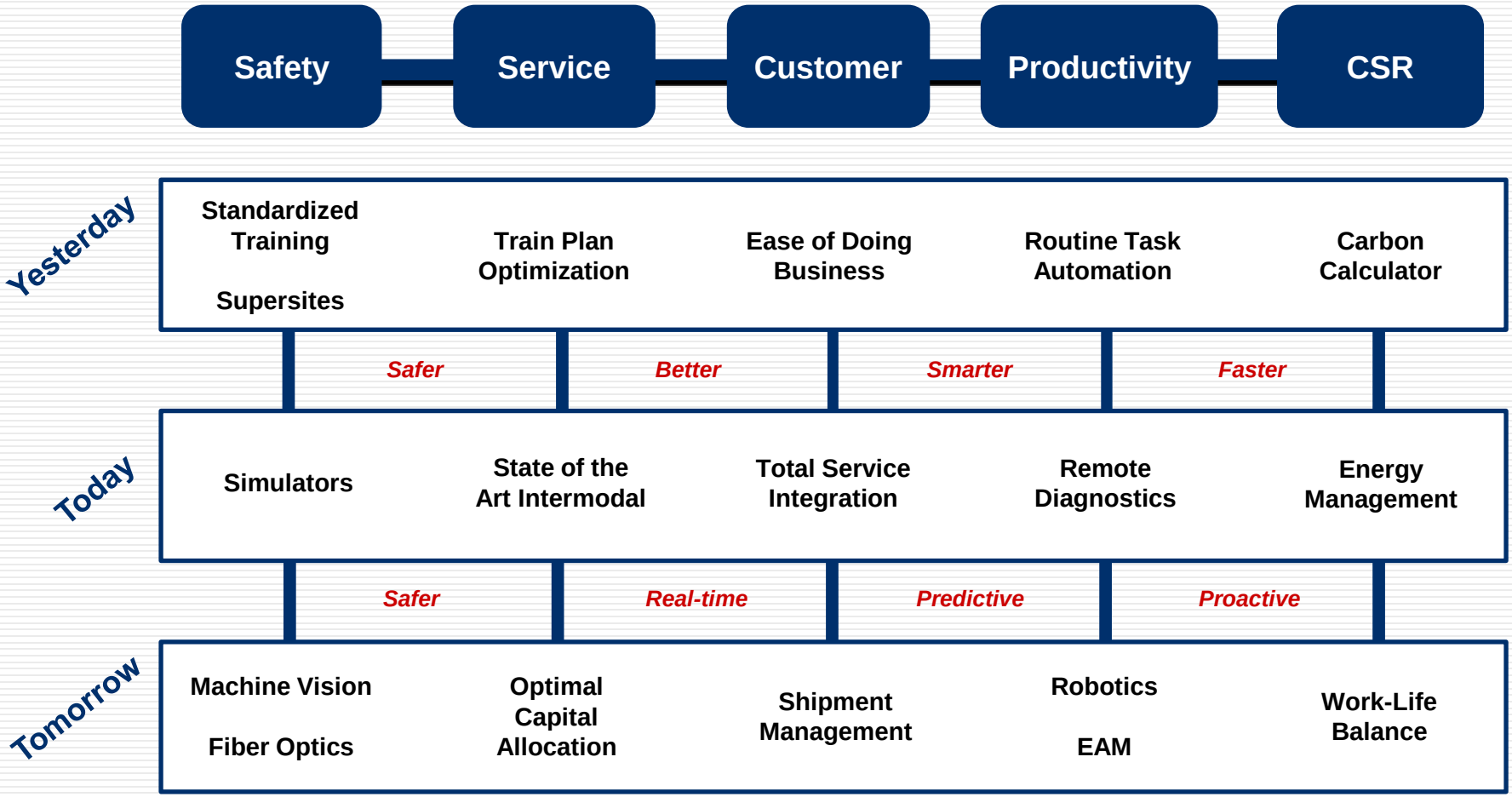
Transportation Research Board - Executive Committee

Frank Lonegro
President - CSX Technology

Challenges and Barriers to Technology Implementation … A Freight Rail Perspective



Notwithstanding the Challenges & Barriers … Technology Helps Achieve Strategic Objectives



Facilitating technology advancement in freight rail … Alignment and Partnership will be key

Academia

- Continue innovation via Research & Development
- Ensure workforce readiness via rail-based curriculum

Regulatory

- Specify desired outcome, not how it should be achieved
- Balance regulation … how much is too much?
- Invest in transportation beyond highways

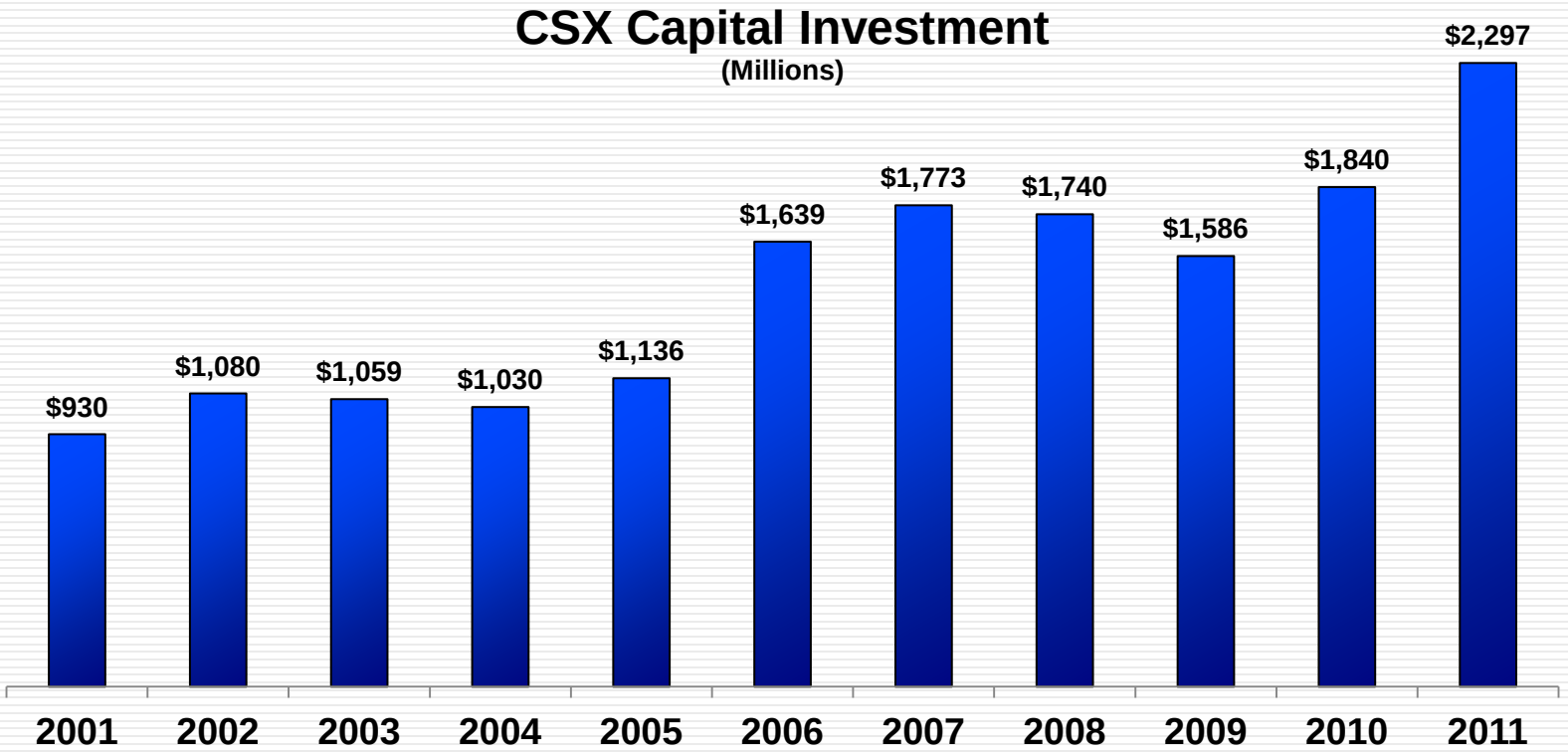
Private Sector

- Share best practices across transportation modes
- Realize that multi-modal transportation is a network of networks
  - And that “coopetition” may be the root of mutual success

Thank you TRB for sponsoring this forum to facilitate communication & innovation

Supporting Slides

Expanding Capital Investment



Carbon Calculator

Carload | Intermodal

Freight Information

Commodity

Type AUTOMOBILE BODY PARTS,

Freight Weight 52 Tons

Truck average miles per gallon 7

Mode of Transportation Note, you may add up to three segments (see below).

Segment 1 ▼ Click to Close

Select mode for segment

(•) Rail

( ) Truck

Transportation Variables

Tons per Unit and Number of Units based on industry averages for commodity, weight and mode of transportation. Tons per unit may be customized, if desired.

Tons per unit 16 Number of units 3

Distance

Origin GA Brunswick or 1041

Destination MI Detroit

Results	Approx. tons CO_2
Your total approximate CO_2 emissions:	1
For this shipment, if this cargo were shipped by truck only:	20
For this shipment, if this cargo were shipped by CSX rail only:	1

Shipping by CSX can reduce CO_2 emissions by approximately **18** tons compared to shipping by truck.

That equals:*

CO_2 emissions from the electricity use of **1** homes for one year.

or

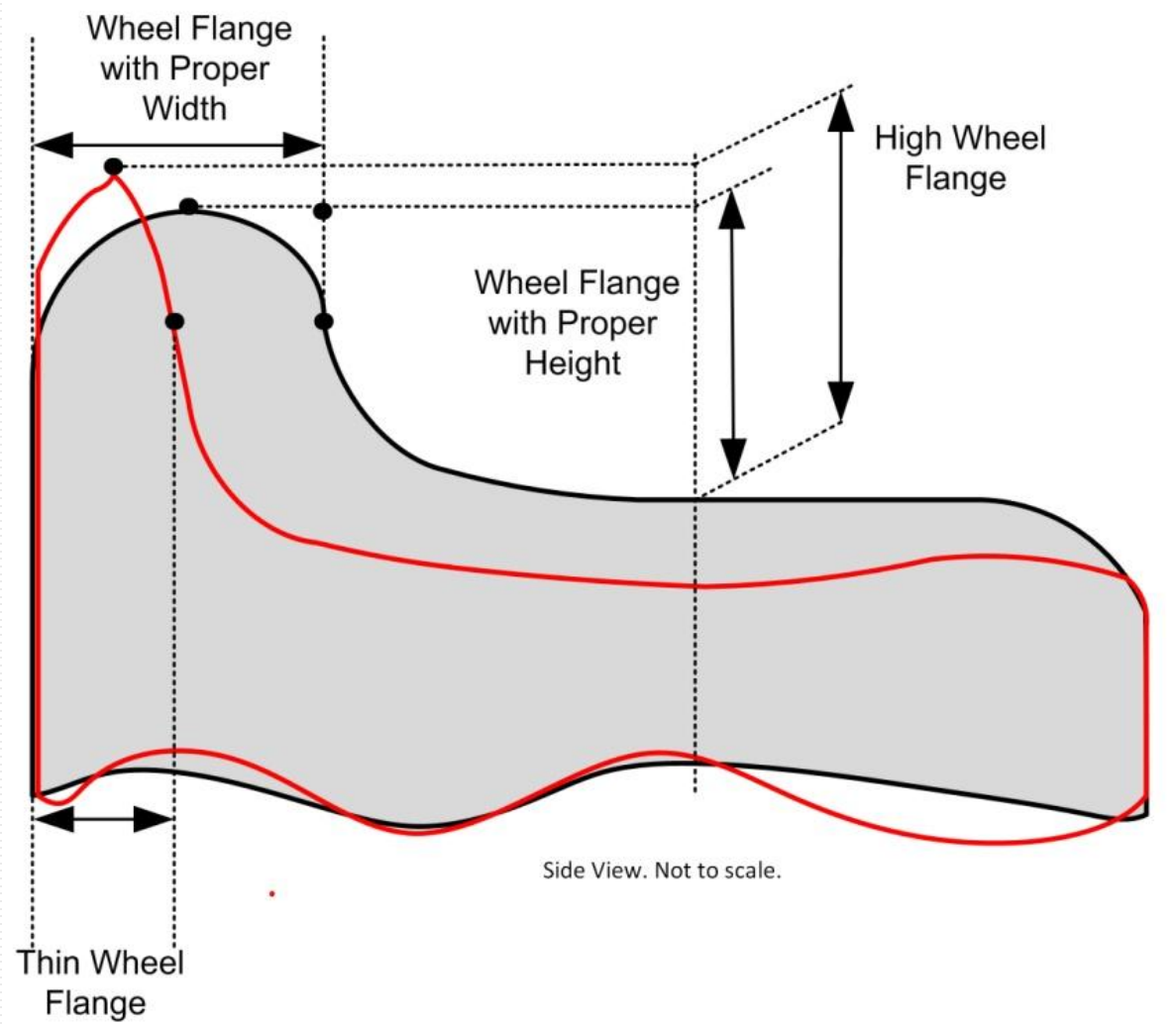
3 acres of pine forests absorbing carbon for one year.

or

Removing the greenhouse gas emissions of **3** passenger vehicles for one year.

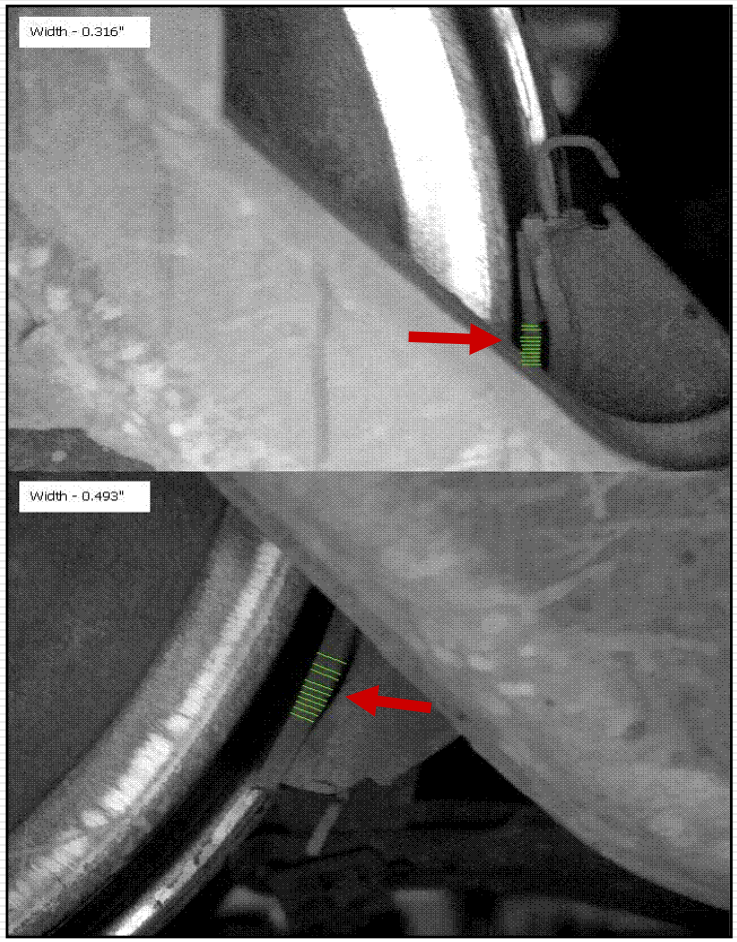
Lowell Supersite

Railcar Wheel Profile

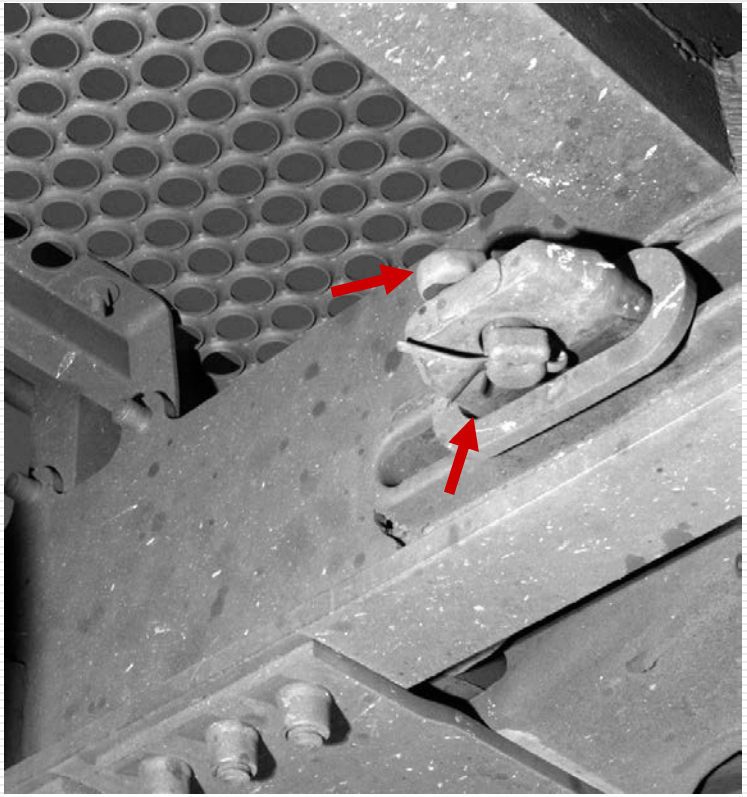


Vision systems provide 24/7 inspection & measurement

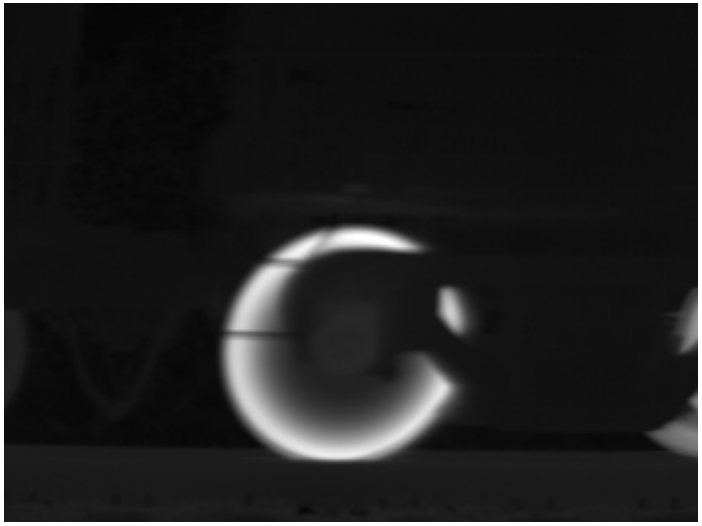
Current: Brake Shoe Measurement

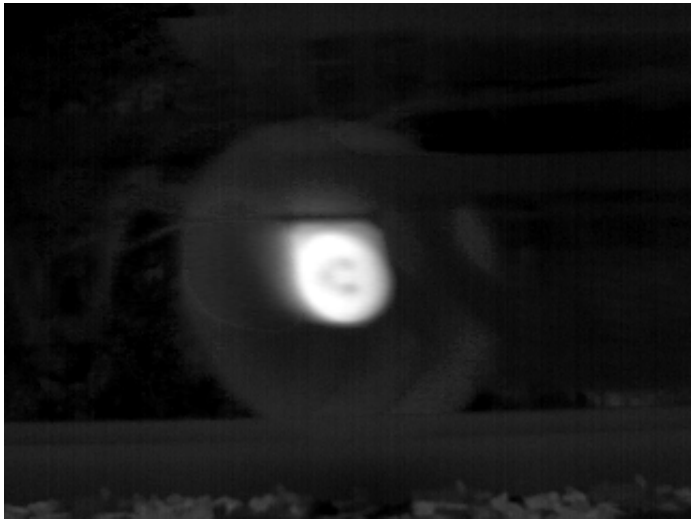


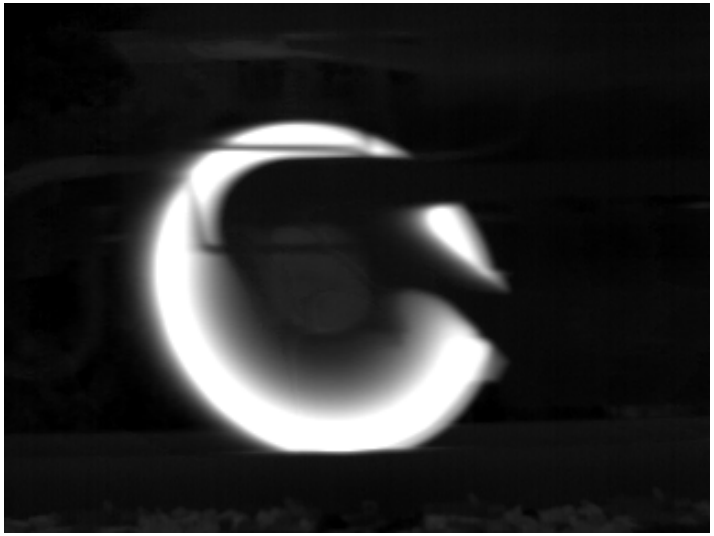
Future: Coupler Securement View



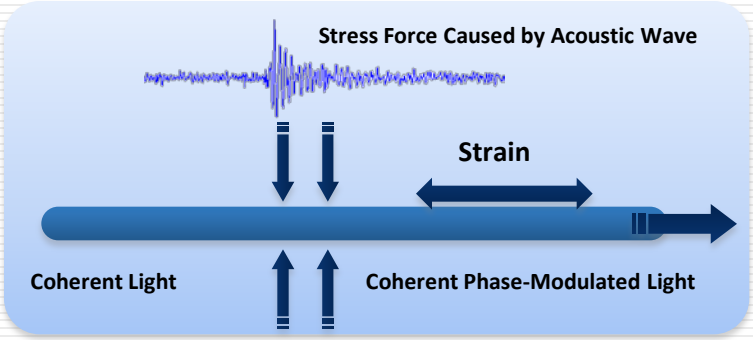
Wheel temperature using thermal vision

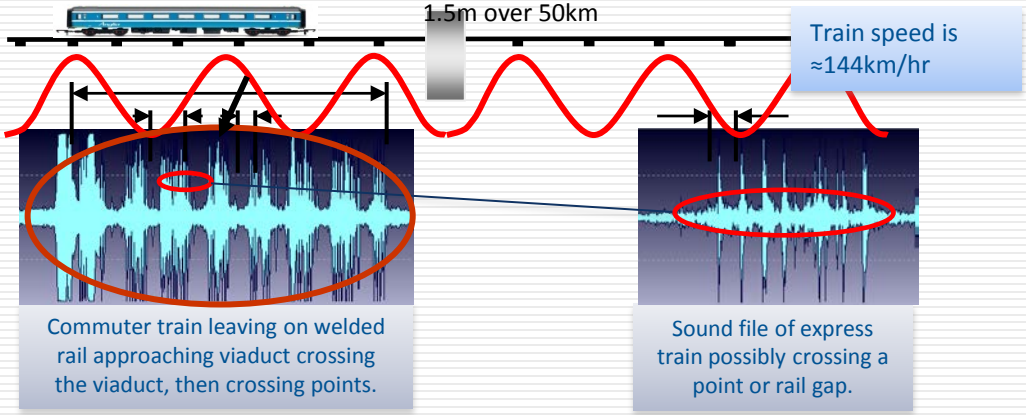




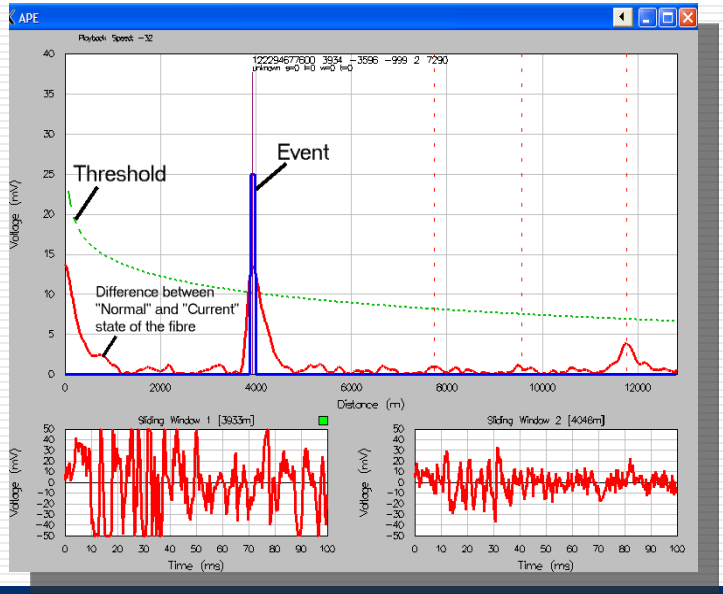


Distributed acoustic sensor using fiber optic cable

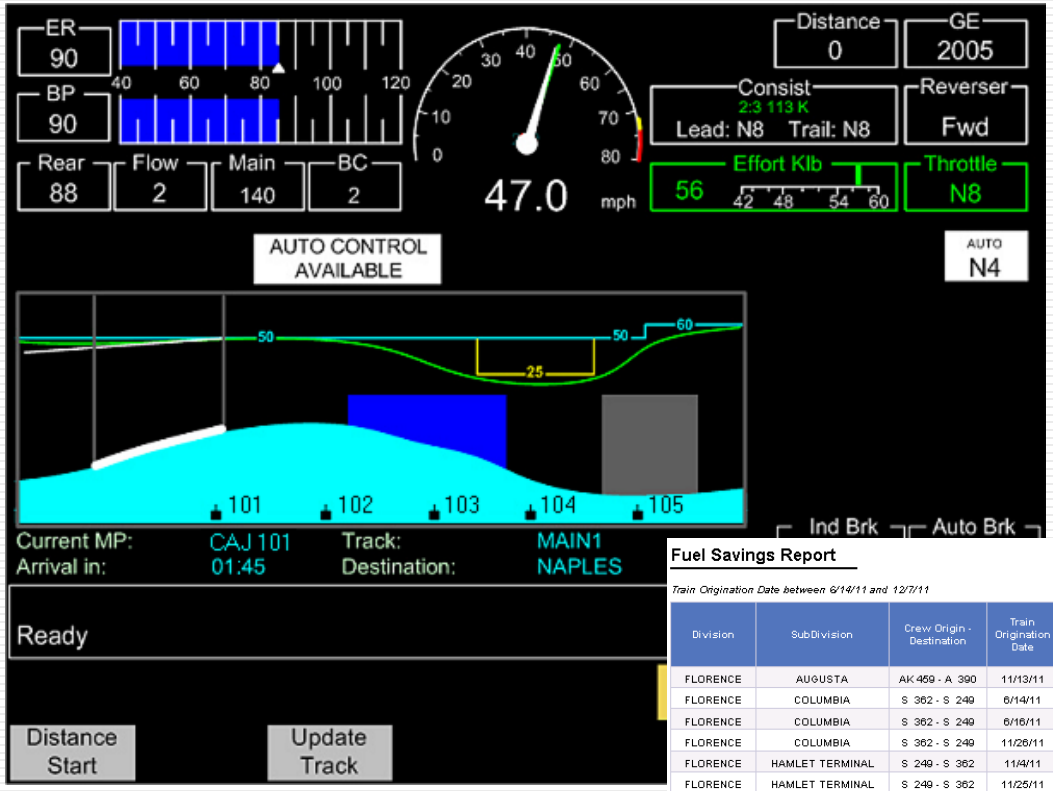




- Acoustic wave causes stress in the fiber cable
- Stress causes noise *(vibrations)* that can be followed as it moves along the railroad
- Unique noise signatures allows for route cause determination
- Signatures (algorithms) correlated to known events can identify:
  - Train presence, Flat Wheels, Broken Wheels, Dragging equipment, Broken Rail, & Hot Bearings
  - Signatures will be developed to identify these unique events by comparing Springfield Supersite events to Fiber Tests



Energy Management



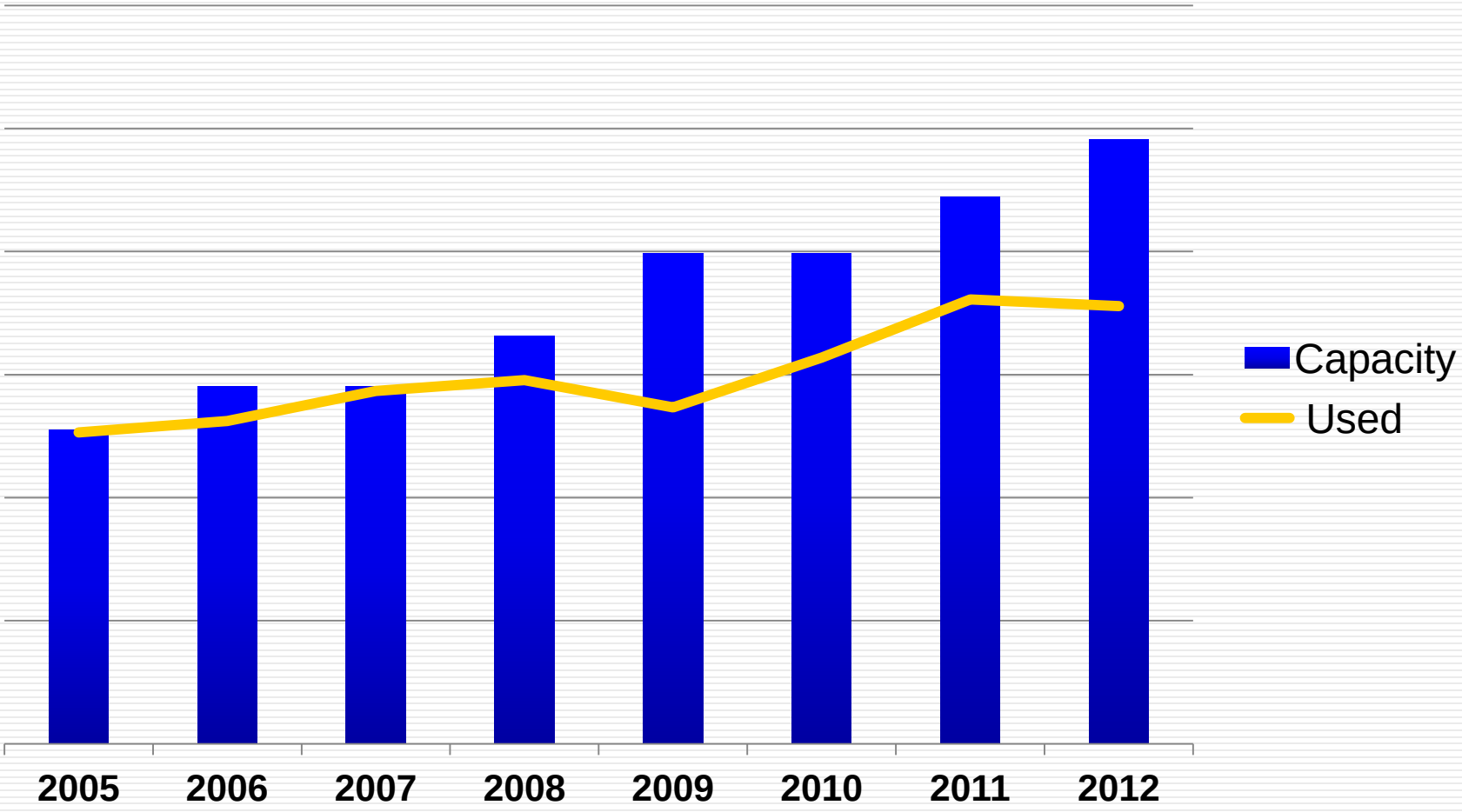
Energy Management controls the throttle position to maximize fuel economy

Fuel Savings Report

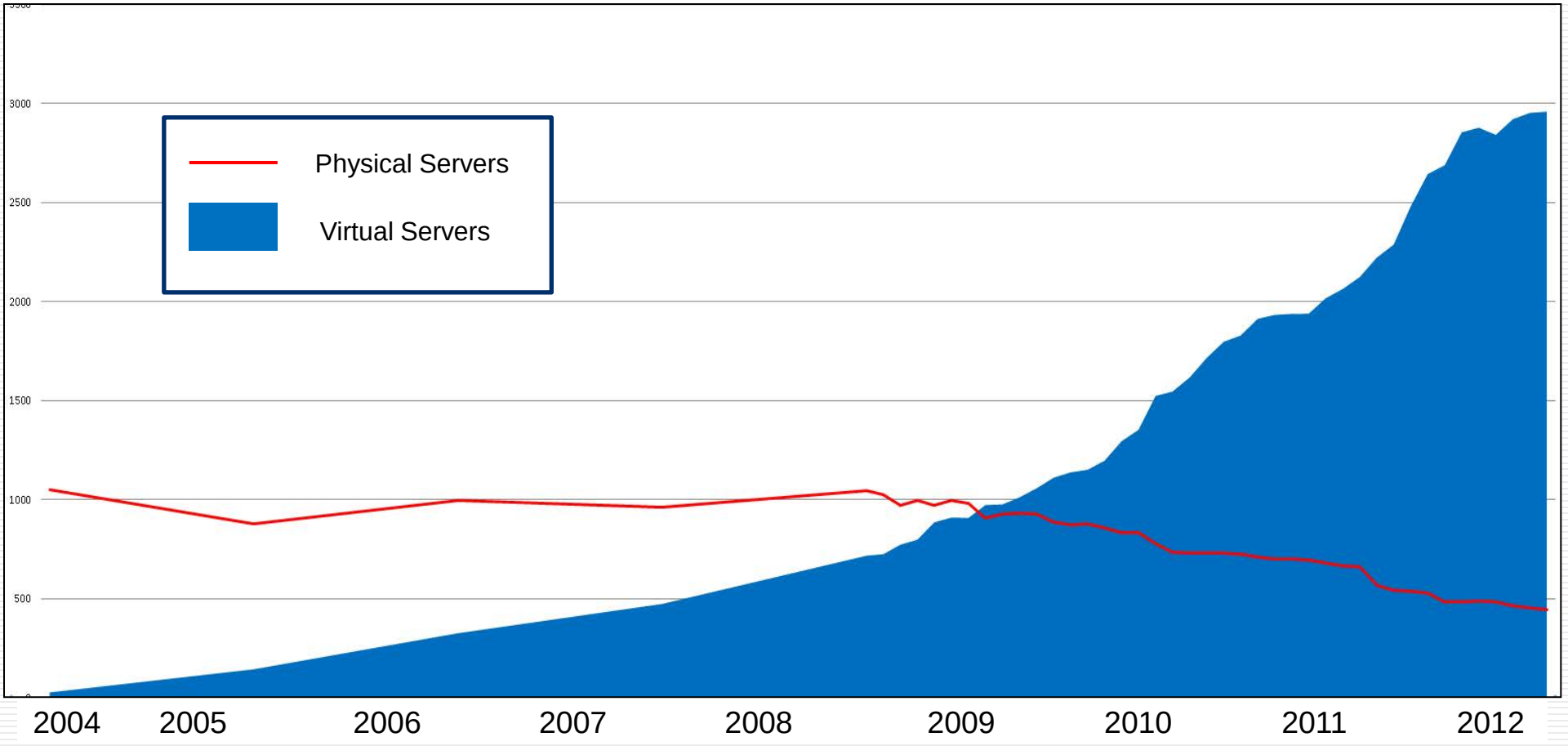
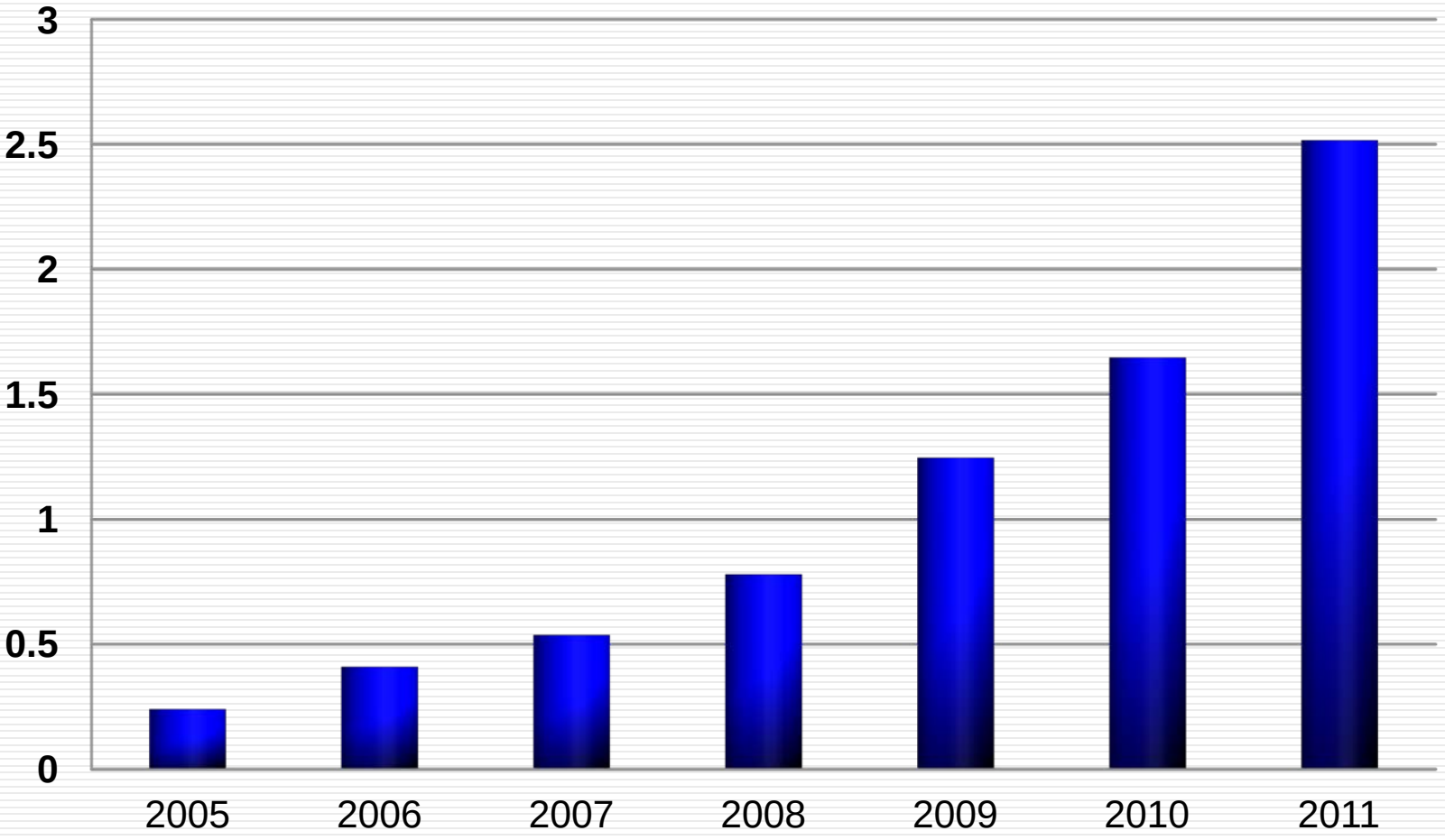
Train Origination Date between 6/14/11 and 12/7/11

Division	SubDivision	Crew Origin - Destination	Train Origination Date	Train ID	Train Type	Employee Full Name	Employee ID	Baseline Total Miles	Actual Total Miles	Total Miles TO Available	% TO Available	Miles TO Used	% Miles TO Used	Baseline Gals Per Kgtm	Actual Gals Per Kgtm	Delta Gals Per Kgtm Diff	Gallons Used	Gallons Saved
FLORENCE	AUGUSTA	AK459 - A 390	11/13/11	N34713	C	BRANTLEY A	1174960	137.7	138.28	0	0%	0	0%	0.53	0.51	-0.02	1,094.25	-48.14
FLORENCE	COLUMBIA	S 362 - S 249	6/14/11	Q46414	M	KELSEY BM	1320675	115.65	116.55					1.33	1.66	0.33	893.94	178.2
FLORENCE	COLUMBIA	S 362 - S 249	6/16/11	Q46416	M	KELSEY BM	1320675	115.65	114.31					1.33	1.24	-0.09	994.18	-72
FLORENCE	COLUMBIA	S 362 - S 249	11/26/11	Q46426	M	UPTON JA	1201458	115.65	115.65	0	0%	0	0%	1.33	2.16	0.83	434.35	167.75
FLORENCE	HAMLET TERMINAL	S 249 - S 362	11/4/11	Q46304	M	UPTON JA	1201458	114.62	114.41					1.14	1.33	0.19	926.2	131.88
FLORENCE	HAMLET TERMINAL	S 249 - S 362	11/25/11	Q46325	M	UPTON JA	1201458	114.62	113.33	0	0%	0	0%	1.14	1.21	0.07	836.65	46.85
FLORENCE	SPARTANBURG	AK593 - Z 134	11/12/11	E12912	C	MURRAY A	1172333	140.73	140.49	0	0%	0	0%	2.01	1.95	-0.06	637.09	-19.59
FLORENCE	SPARTANBURG	AK593 - Z 134	11/18/11	E10818	C	STOKES IP	1199412	140.73	140.21	0	0%	0	0%	2.01	1.79	-0.22	744.05	-90.78
HUNTINGTON	BLUE RIDGE	Z 134 - AK593	10/20/11	U30320	C	EDWARDS M	1321586	141.26	139.44					0.8	0.48	-0.32	1,059.97	-711.13
HUNTINGTON	BLUE RIDGE	Z 134 - AK593	11/13/11	N34713	C	MEEHAN P	1041480	141.26	139.44	0	0%	0	0%	0.8	0.84	0.04	1,838.28	85.68
HUNTINGTON	BLUE RIDGE	Z 134 - CMG142	12/6/11	E81306	C	FAIN CW	1239101	147.46	148.47	92.95	63%	87.73	94%	1.31	1.05	-0.26	408.11	-99.89
HUNTINGTON	BLUE RIDGE	Z 134 - CMG142	12/7/11	T36407	C	ARROWOOD	1321697	147.46	146.58	0	0%	0	0%	1.31	1.2	-0.11	482.89	-43.77
HUNTINGTON	BLUE RIDGE	Z 134 - Z 245	10/23/11	V38723	C	MURRAY A	1172333	107.78	104.72					0.88	0.86	-0.02	1,410.76	-35.88
HUNTINGTON	BLUE RIDGE	Z 134 - Z 245	11/5/11	V46905	C	WHITE RA	1176951	107.78	106.03	0	0%	0	0%	0.88	1	0.12	1,099.76	135.43
HUNTINGTON	BLUE RIDGE	Z 134 - Z 245	12/4/11	Q69604	M	BURTON CI	1375990	106.81	108.03	51.34	48%	43.19	84%	1.22	1.27	0.05	481.41	20.59
LOUISVILLE	LOUISVILLE TERMINAL	000006 - 0KC110	12/1/11	Q22601	A	DEUBER M	1201427	118.38	119.49	0	0%	0	0%	1.24	1.59	0.35	938.23	205.43
NASHVILLE	NASHVILLE TERMINAL	000187 - 000006	11/29/11	Q21029	A	OLIVER JD	1573717	181.88	179.82	0	0%	0	0%	1.24	1.45	0.21	732.62	106.15

Mainframe MIPS Growth



The Growth of Virtual Servers



Storage Growth - Gigabytes