

Getting ready for the Digital Railway

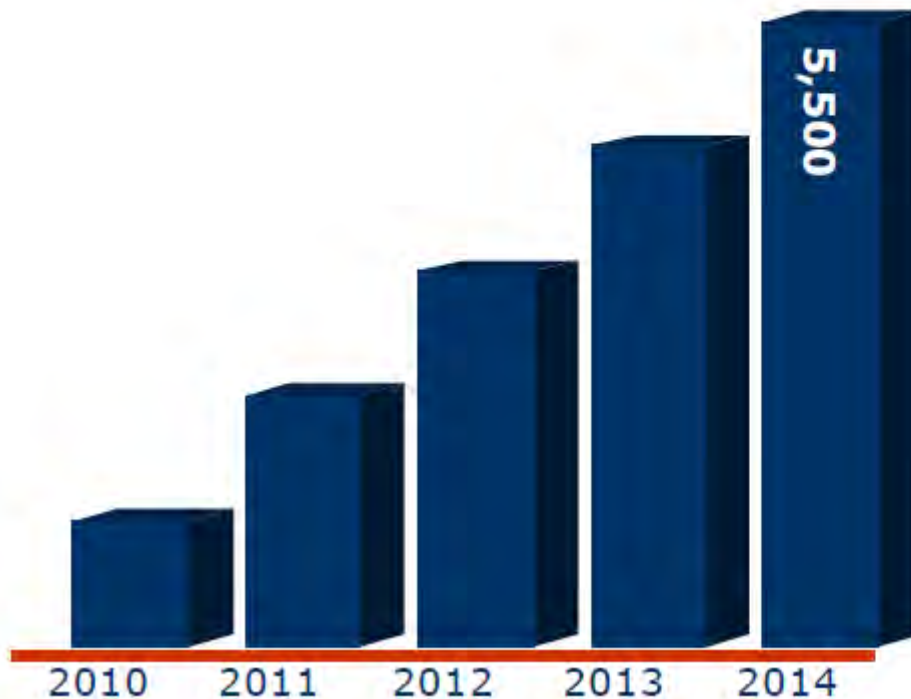
How can new technologies provide real time information that drives tactical decision-making?

- Automated train crew work orders
- Network-centric train scheduling and supply/demand balancing
- Automated train pacing
- Optimized train driving
- Terminal automation
- Automated inspection
- Predictive, preventive work ordering
- Computer-aided train dispatching and track warrants
- Shipment tracking and ETA forecasting



Why we need the Digital Railway

Forecasted unionized attrition (Number of employees, cumulative)



Opportunities

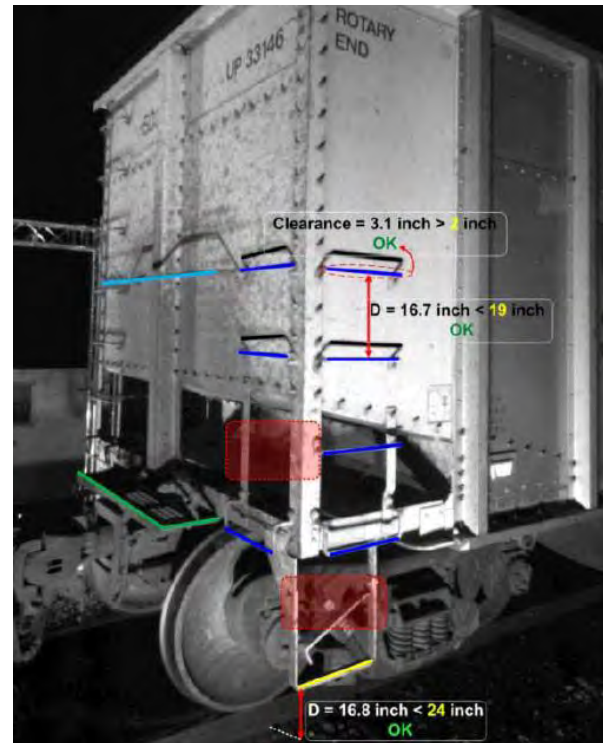
- Demographics
- Service reliability
- Efficiency
- Capacity



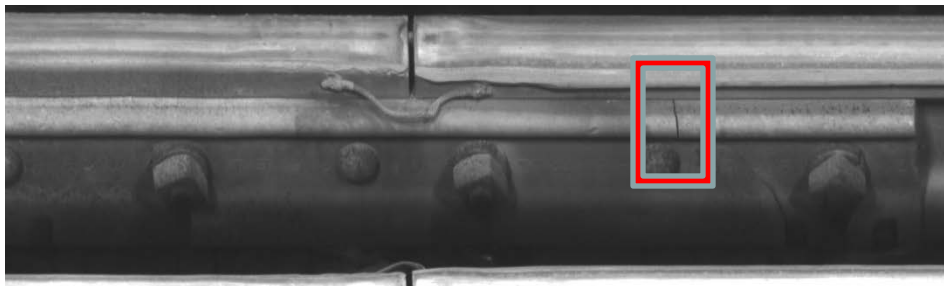
Building Blocks



AIR Tablet



Digital Imaging
Inspection of
Freight Car Safety
Appliances



Digital Imaging
Inspection for Joint
Bar Cracks



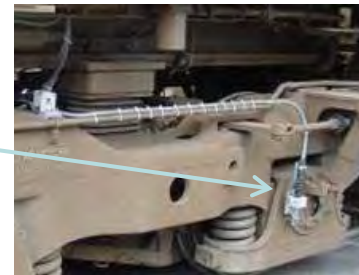
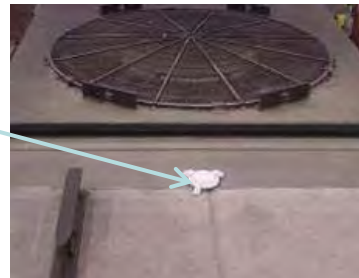
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**Acoustic
Bearing
Detector**



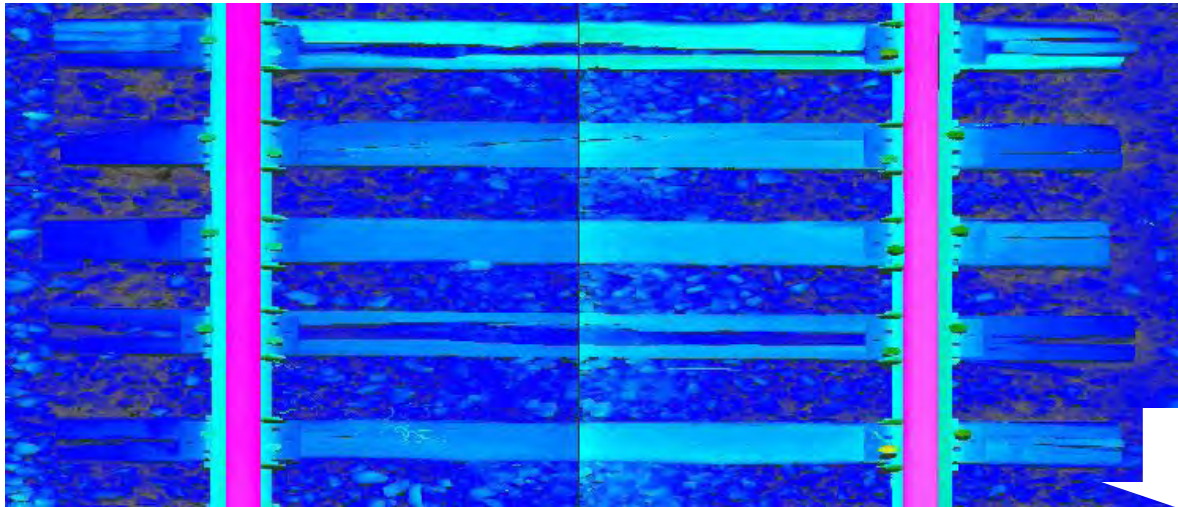
**FACTIS®
Inspection of
Wheel and Brake
Shoe wear**



**V/TI© equipped
locomotives**



Building Blocks



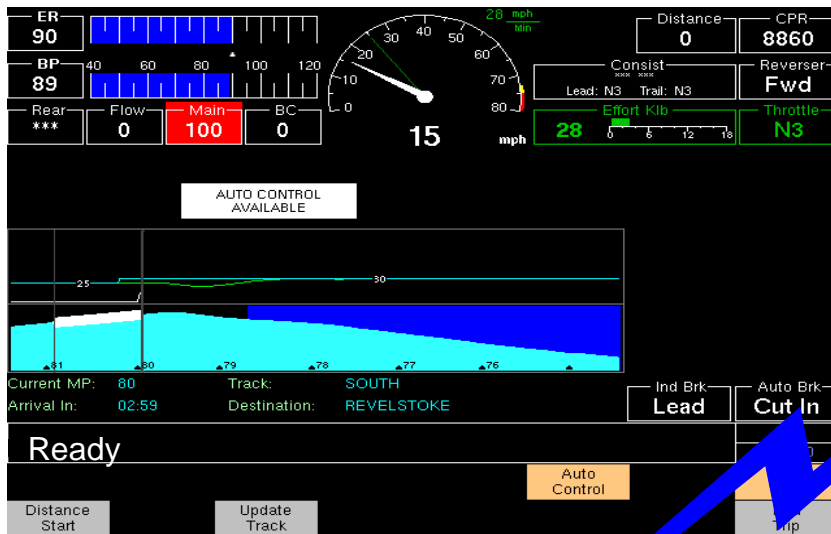
**Infrared
assessment of tie
condition**

**Remote monitoring
of rail stress state**

Salient System's Rail Stress Module (RSM)



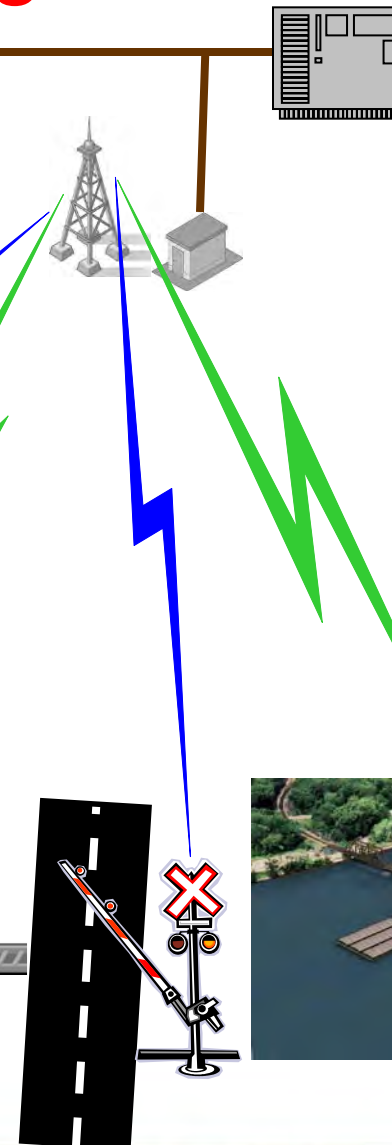
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Fuel Optimizer Cab Display



Wireless train control and control point remote monitoring



Building Blocks



ECP braking and trainline electronic communications

Cold Slow Order

Calculate

Subdivision	Maple Creek	
Current Temperature	-30	°C
Last WILD Impact	140	kip
Last WILD Speed	40	mph
Max. Allowable Speed	48.0	mph

Rules engine for cold weather speed restrictions to maintain constant level of risk



What's Missing ?

- Standardized communications protocol
- Standardized end-to-end processes supported by “back-office” technology
- Business objects/data warehouse/auto-trending`
- GPS/GIS referencing
- Rules engines
- Cross-functional decision tools



Barriers to Success

- Functional agendas and budgeting
- Regulations prescribing manual inspections and immediate action
- Commoditizing supplier product offerings
- Talent pool/Learning environment
- Tactical railway culture vs. stick to the plan
- Shipper bias from regulators



Questions?



CANADIAN PACIFIC

DRIVING THE DIGITAL RAILWAY »



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