



# RAILPULSE

## Transforming the Rail Shipping Experience

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# AGENDA



1

**The Rail Technology Gap**

2

**What is RailPulse?**

3

**RailPulse Value Proposition**

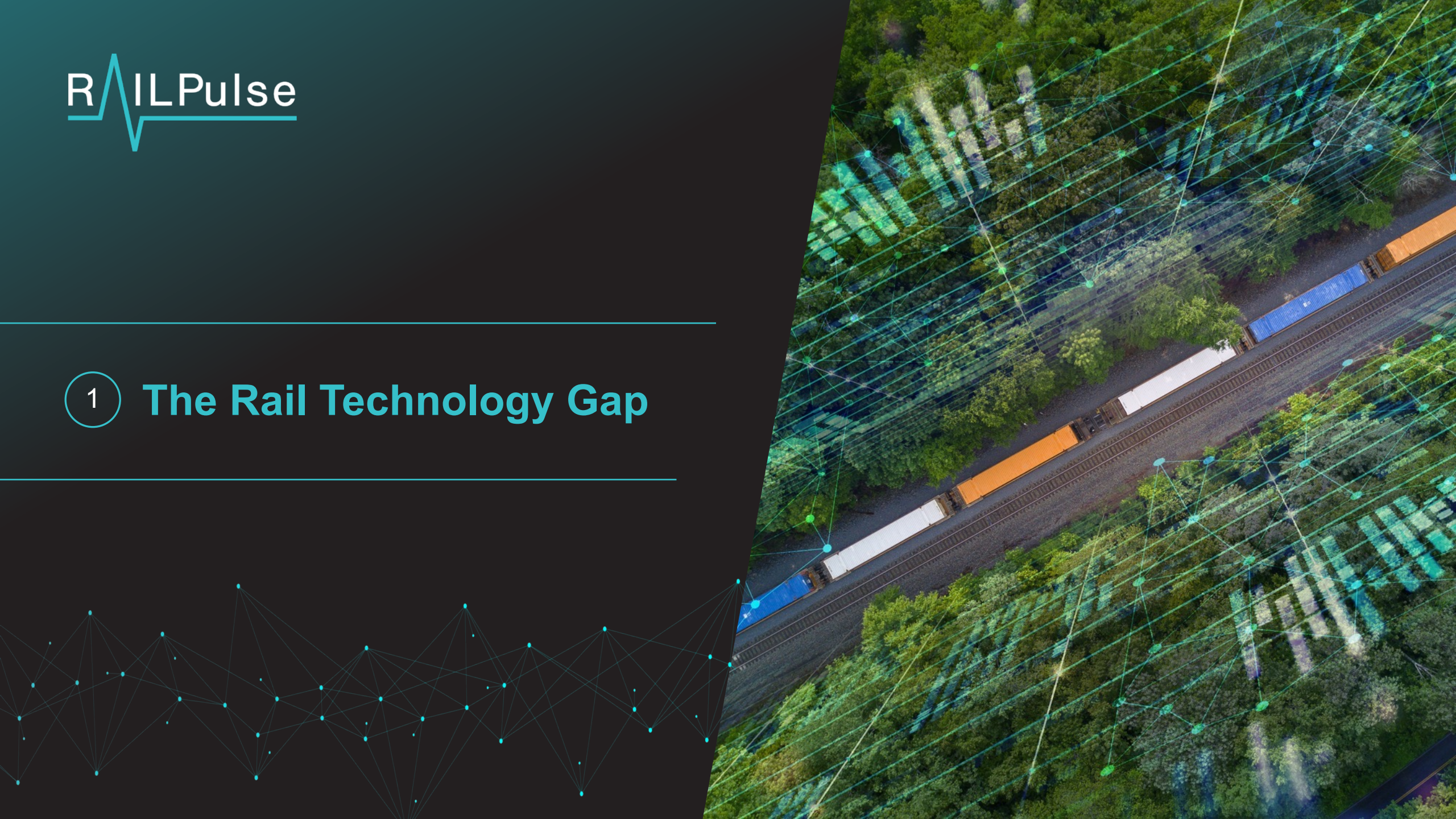
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**RailPulse Status Update**





# 1 The Rail Technology Gap



# RAIL'S INHERENT VALUE PROPOSITION



## SAFETY

**Fewer**

*Fatalities per Ton Mile than truck*

**Fewer**

*Injured persons per Ton Mile than truck*

**>99.99%**

*Hazmat moved by rail reaches its destination without release*



## EFFICIENCY

**470 miles**

*One ton of freight on one gallon of fuel*

**\$740Bn**

*Private investment in infrastructure  
1980-2020*

**>50%**

*Share of the North American railcar fleet  
owned by lessors*



## SUSTAINABILITY

**0.6%**

*Freight rail share of total U.S.  
greenhouse gas emissions*

**13.1Mn tons**

*Reduction in GHG emissions if 25% of  
truck traffic moved to rail*

**75%**

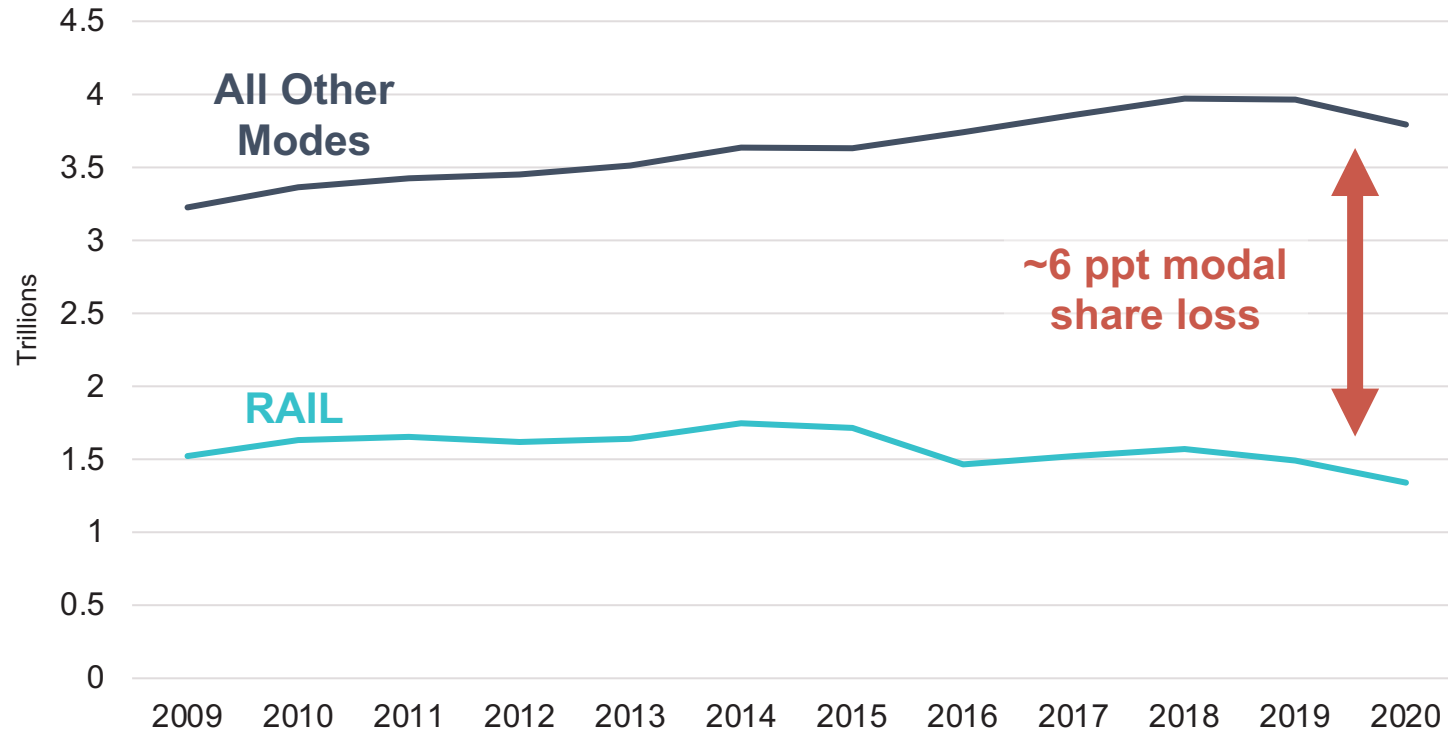
*Emissions reduction converting one load  
from truck to rail*



# RAIL INDUSTRY'S CHALLENGE

## U.S. Freight Ton Miles by Mode of Transportation

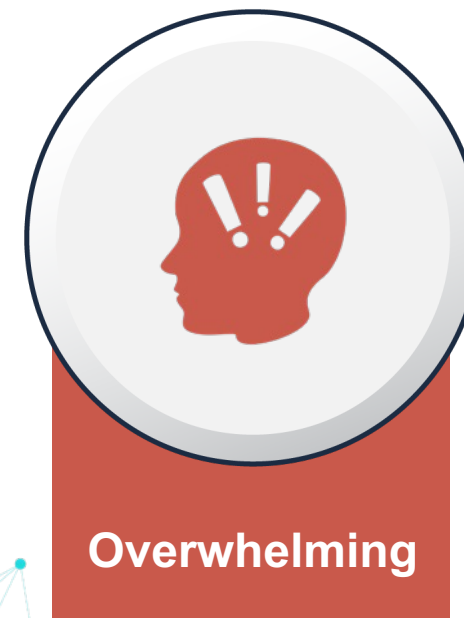
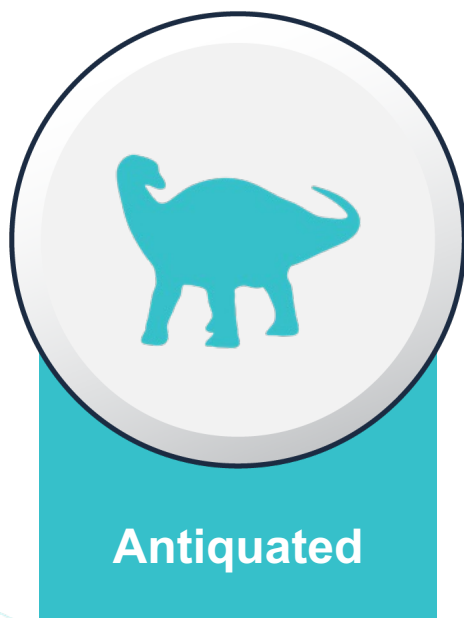
Source: FTR Intelligence



Truck's value to shippers is increasing while **RAIL** is not keeping up

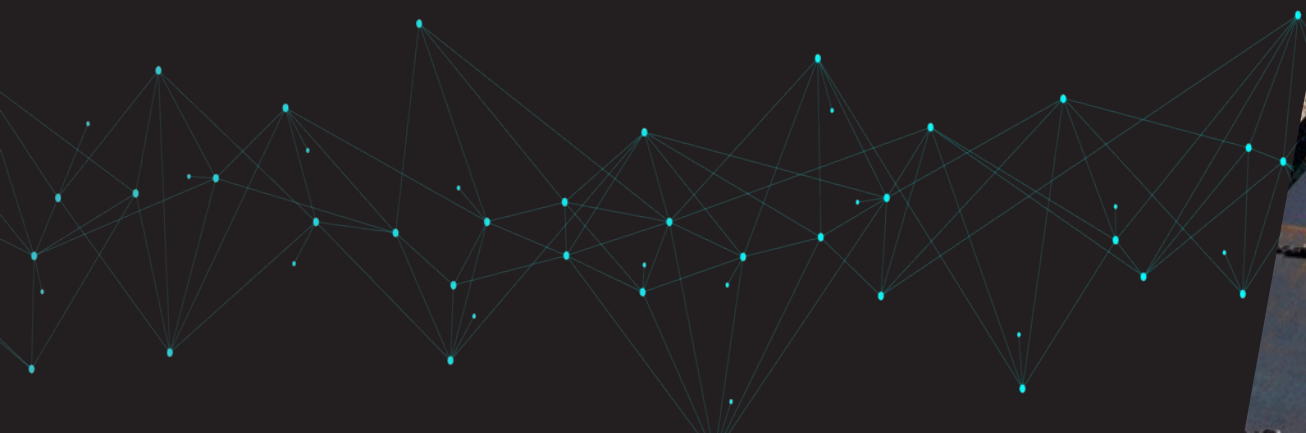
*"If you have a load that doesn't need to be anywhere in a hurry, you put it on a train"*

**Rail shippers lack visibility into their supply chains...**





## 2 What is RailPulse?



# WHAT IS RAILPULSE?



*A joint venture of*



## TO DEVELOP A NEW TECHNOLOGY PLATFORM

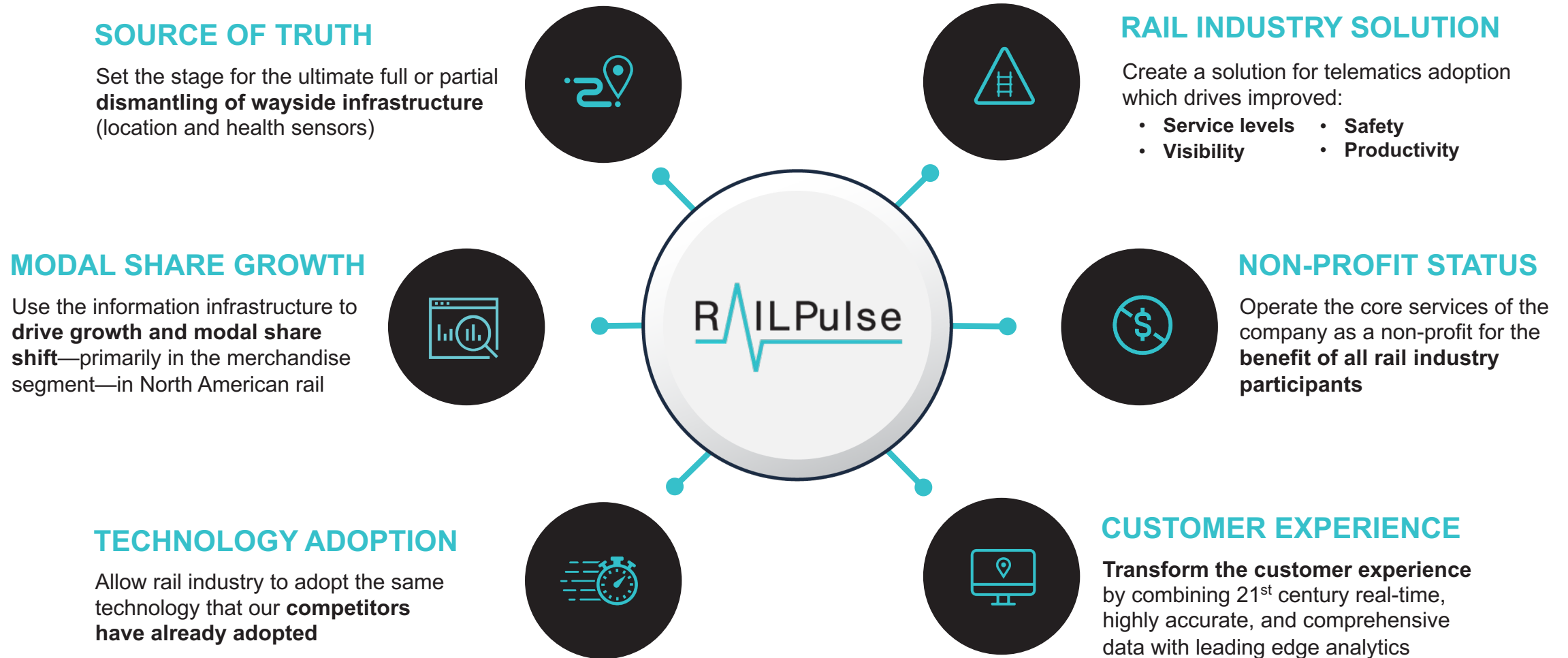
that provides real-time data via GPS and other telematics technology across the North American Railcar fleet

Represents  
**30%**  
of North American  
railcar fleet

Expected roll-out by  
**FALL**  
**2023**

Initial focus on  
**SAFETY**  
(e.g. Handbrake  
and impact data)





## RAILPULSE WILL ACCOMMODATE 3 MAJOR FUNCTIONAL AREAS:



### LOCATION

Track-level GPS  
Lat-Long location of  
the car, both moving  
and stopped



### CONDITION

#### Status of the car:

- Loaded/Unloaded
- Doors Open/Closed
- Hatches Open/Closed
- Temperature
- Moisture
- Impact
- And more!



### HEALTH

#### Mechanical health of the car including:

Bearings, Bolsters, Air,  
Couplers, and any other  
equipment health  
componentry with sensor  
capabilities





## 3 RailPulse Value Proposition



## Value from LCH (Location, Condition, & Health) Monitoring



### Visibility for Operational Planning

Real-time, highly accurate shipment visibility to support operations

Exact location, ETAs, load notifications



### Asset Productivity & Fleet Size

Railcar asset productivity remains stubbornly low, hindered by real-time location and condition of assets



### Asset & Activity Accounting

Real-time billing as product is delivered, GPS time stamps will help drive out demurrage, storage & claims disputes, equipment & lading damage disputes, and more



### Asset Health & Safety

Our industry relies almost solely on wayside detection and human observation to determine potential problems with asset health



### Data Integration

Standardized sensor data and shipment information in one location or via API to supports TMS and ERP systems



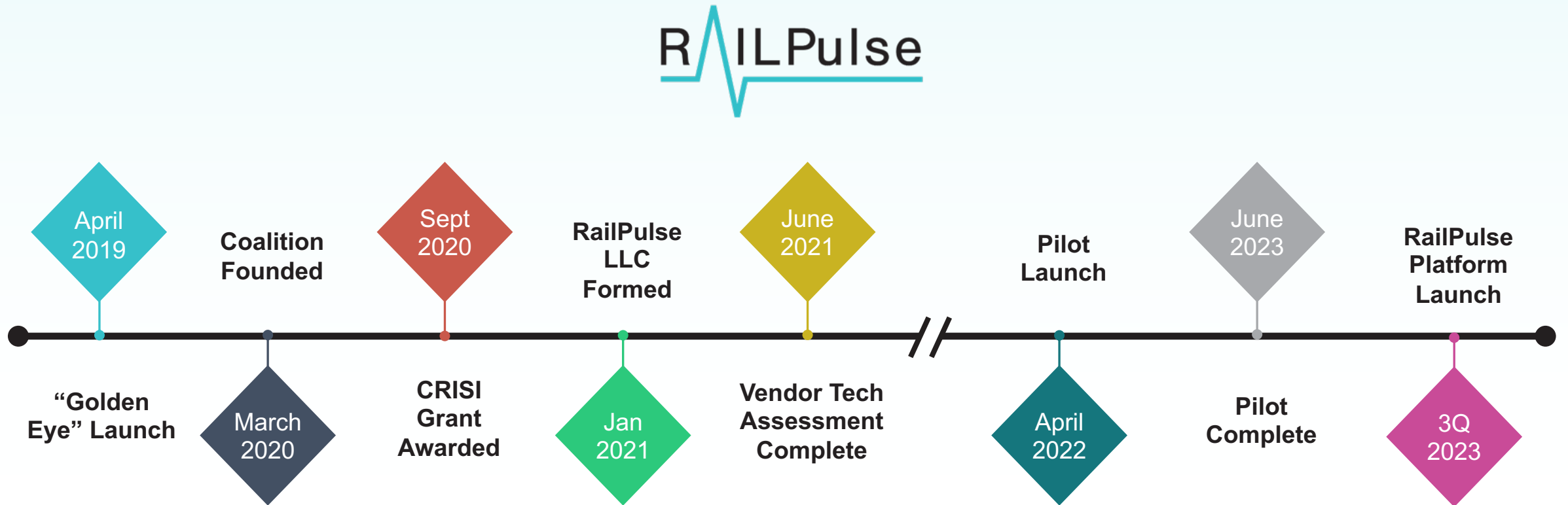


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## RailPulse Status Update

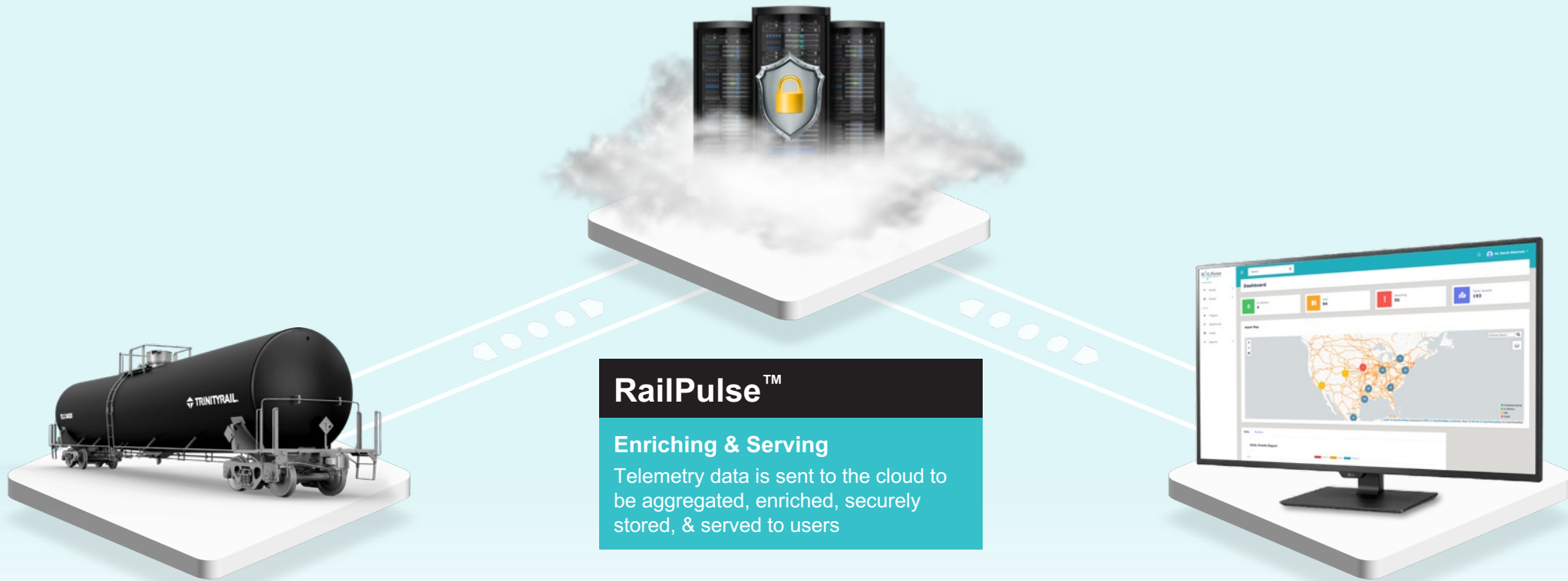


# RAILPULSE CURRENT STATE





# RAIL SUPPLY CHAIN TELEMATICS FLOW



## RailPulse™

### Enriching & Serving

Telemetry data is sent to the cloud to be aggregated, enriched, securely stored, & served to users

## Equipment Owner

### Generation

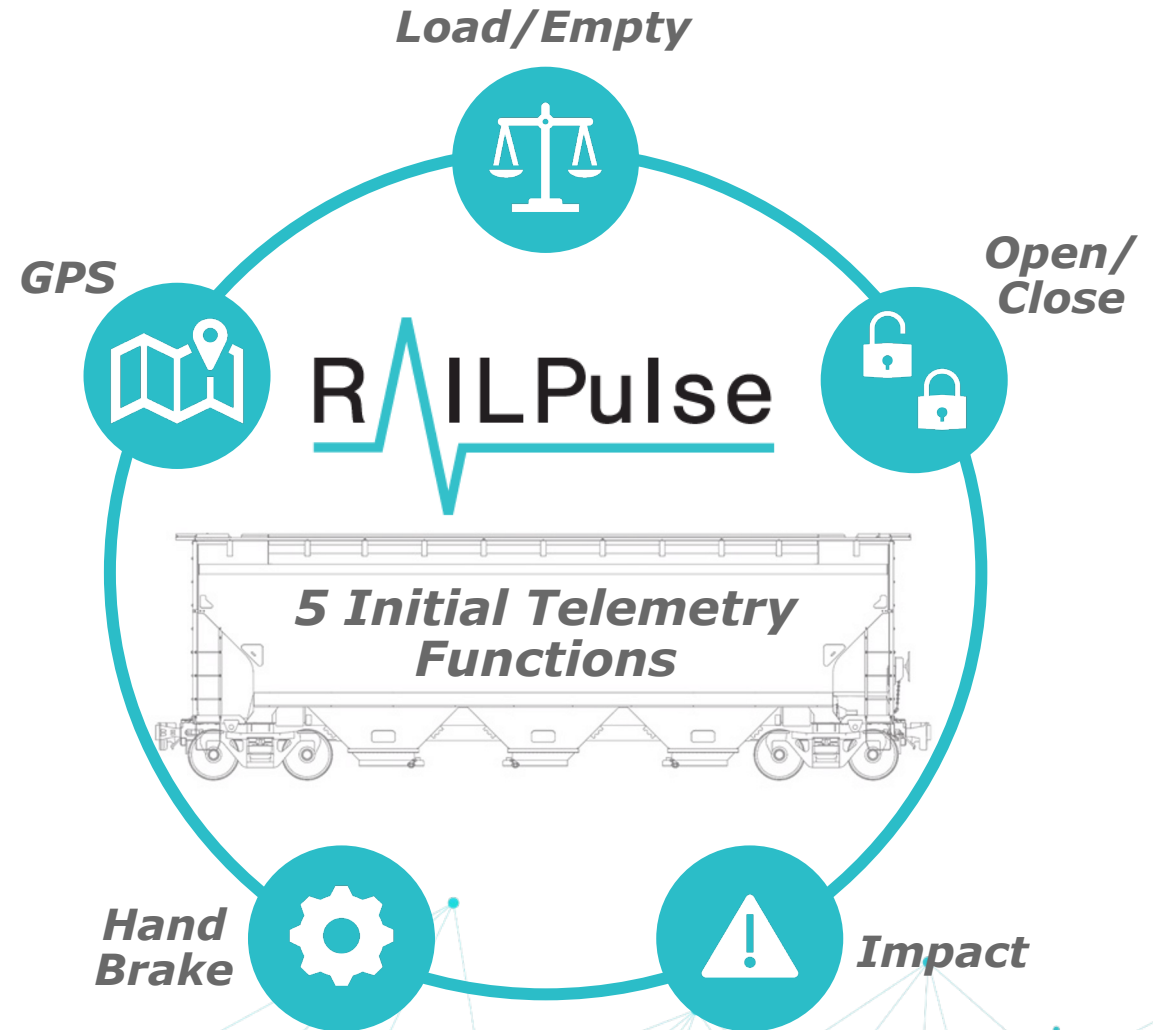
Raw data is generated by sensors and GPS about the railcar's location, condition and health.

## Interface Provider

### Delivery

RailPulse and other web applications generate insights that help users make better, more informed decisions.

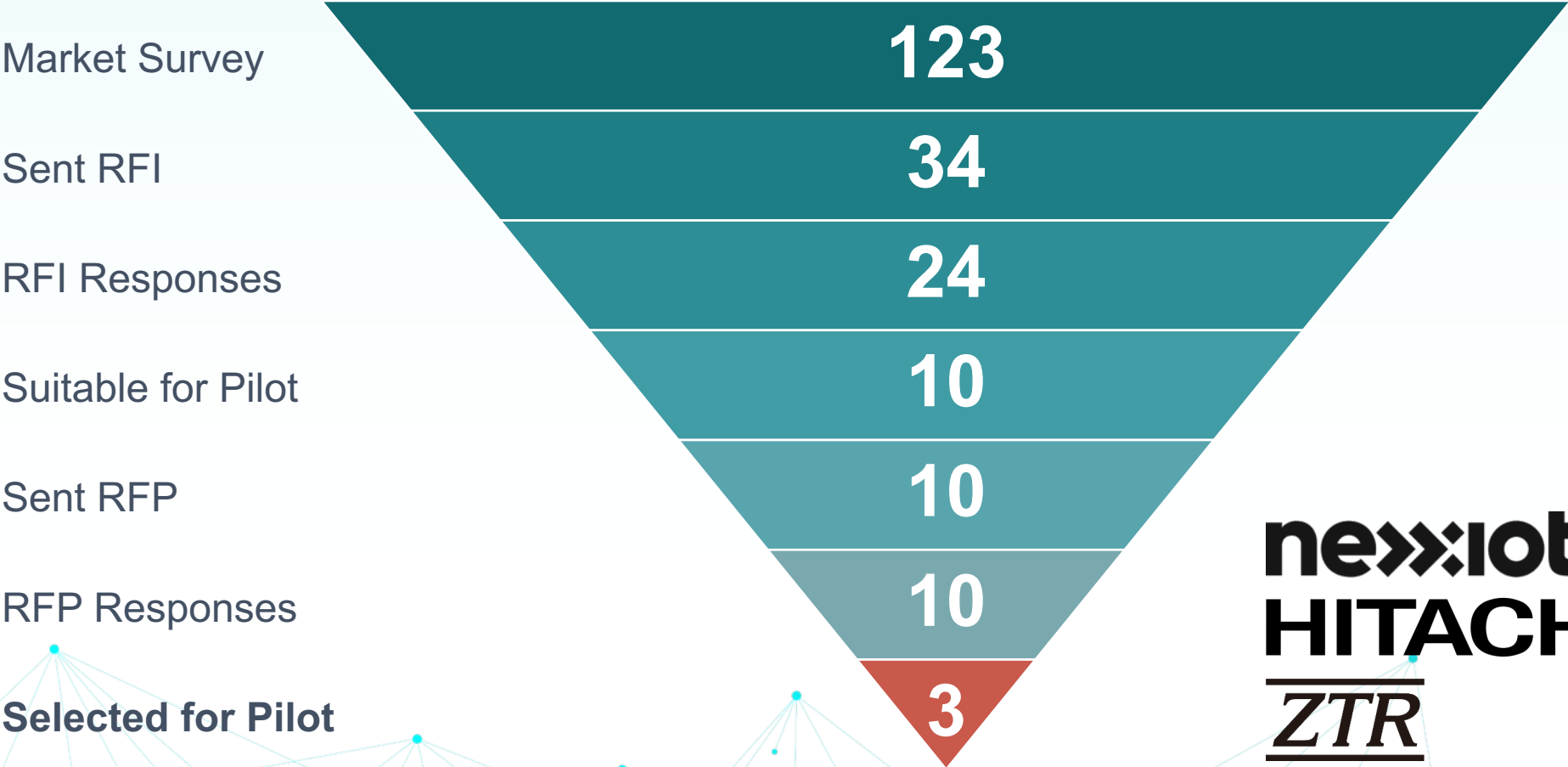
- More than just GPS location
  - 5 Sensor suite on all cars
  - “off-the-shelf” minimal modifications
- Multiple car types
  - Gondolas, Boxcars, Tank cars, Covered hoppers, Autoracks
- Integrated software platform
  - Telemetry data
  - Waybill, CLM, Umler
  - Secure
  - Standards based





Vendor Assessment Funnel for RailPulse Pilot

*Number of Vendors at Each Stage*

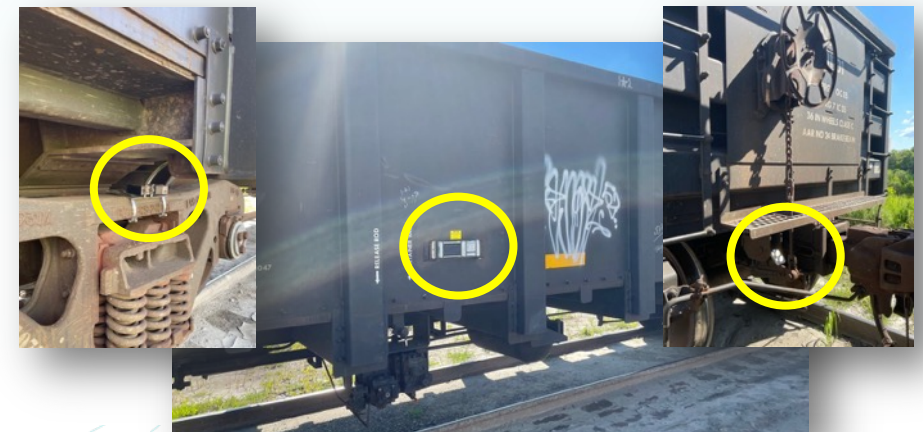


**nexxiot**  
**HITACHI / IMT**  
**ZTR**

- Cycle 1: Completed – June 2022
  - ✓ Device test & validation on multiple car types
- Cycle 2: Ongoing – Fall 2022
  - ✓ Prove deployment & function of sensors & gateways at scale
- Cycle 3: Target – Early 2023
  - RailPulse system testing
  - Shipper use case development
  - Vendor and subscriber onboarding process development

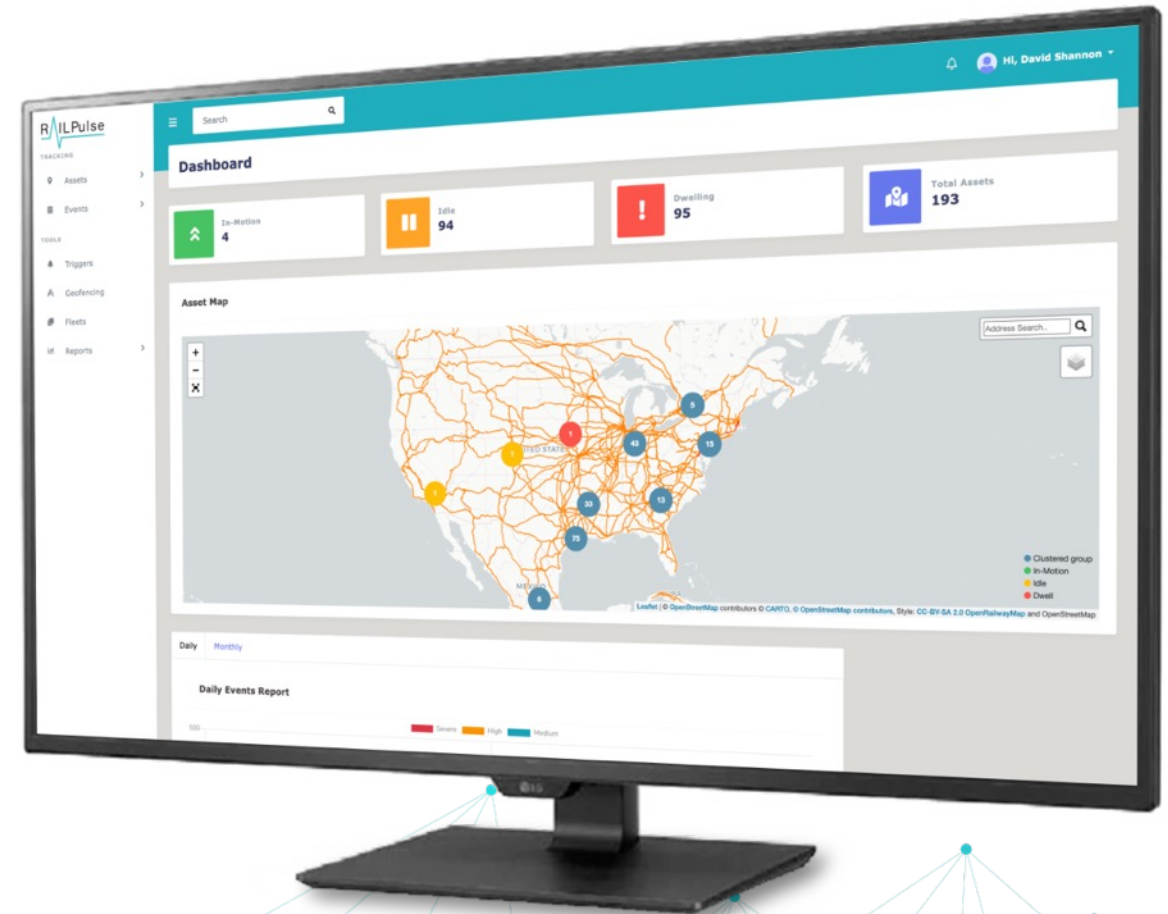


Cycle 1 Impact Sensor Validation



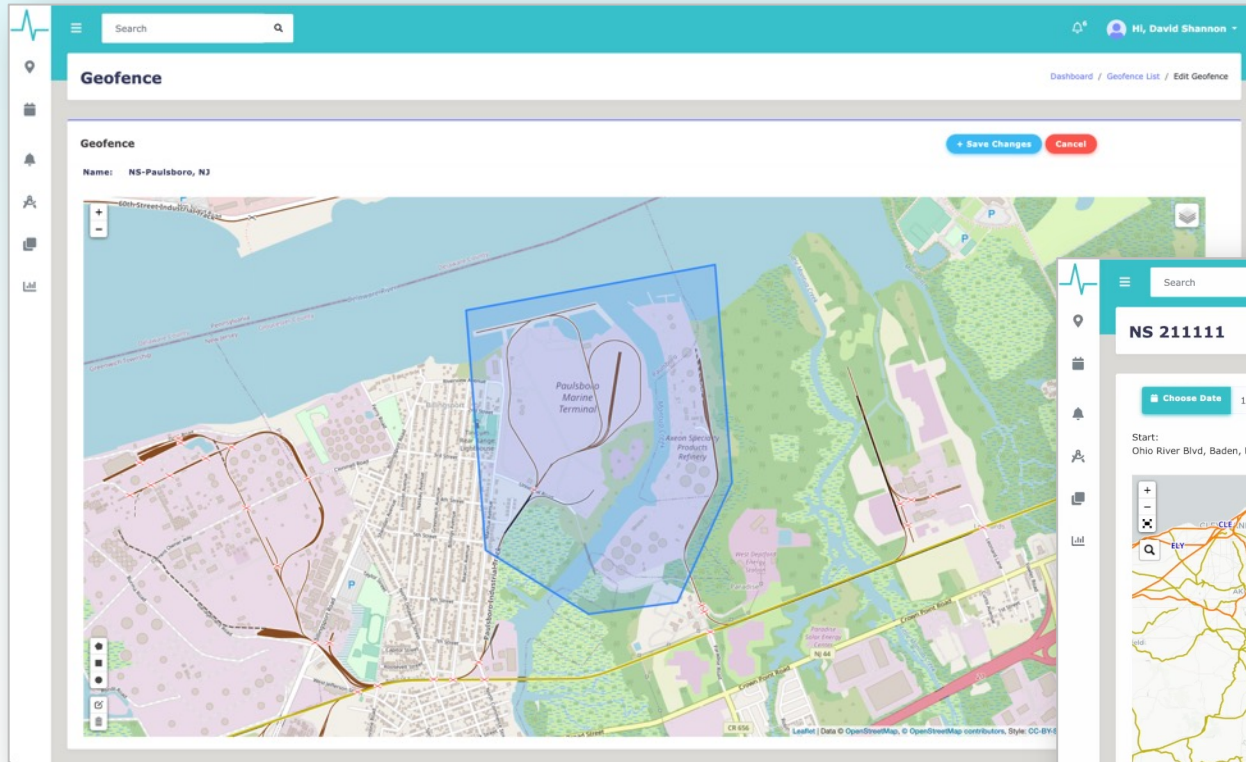
Cycle 2 Installation on Mill Gondola

- Real time location & journey play back
- Railcar condition monitoring
- Safety events
- Enriched with Waybill & CLM data
- Fleet reporting
- Real Time exception alarms
- Dynamic ETA Calculation
- Shared stakeholder access
- Extensible for additional sensors

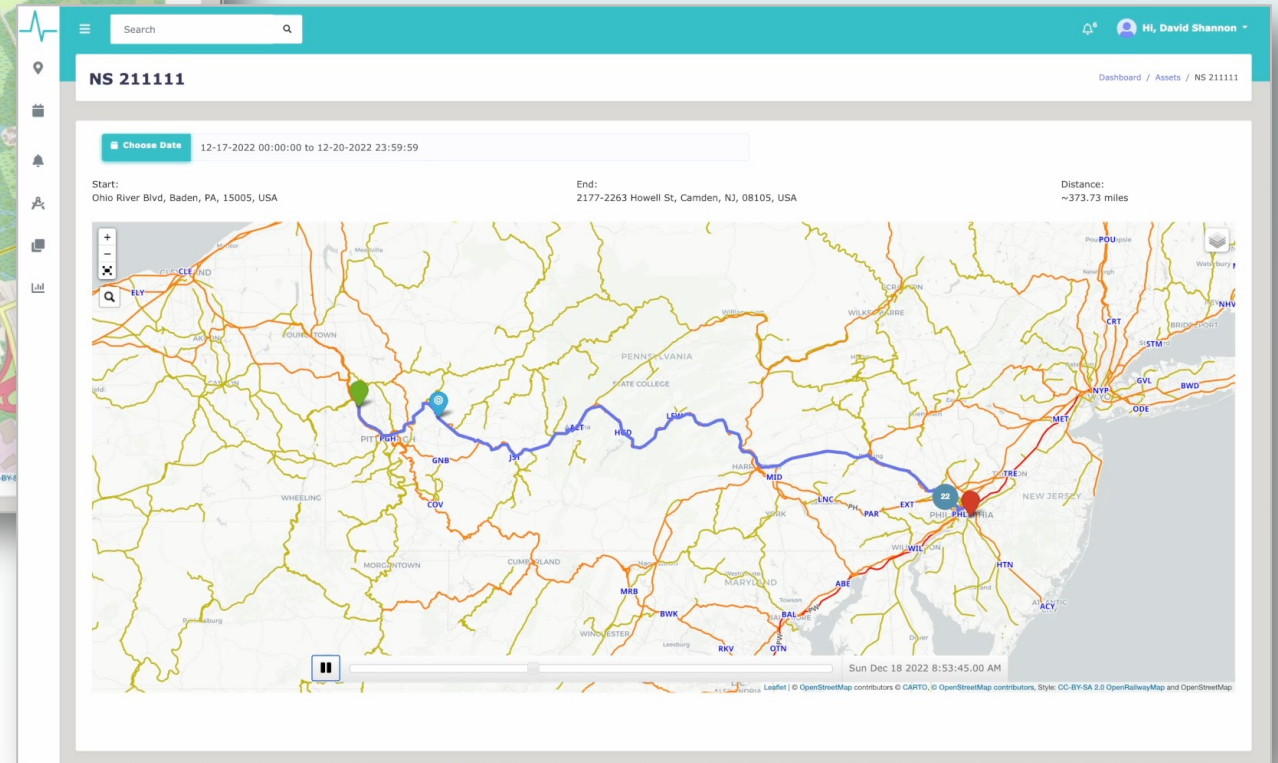




# RAILPULSE SOFTWARE PLATFORM



*Real-time geofence activated alerts*



*Real-time, detailed movement information with playback*

- RailPulse Standard: Transparent, predictable, and fairly-applied
- Leverage existing standard
  - Extended for RailPulse requirements
  - Version control to maintain alignment with standards body over time
  - Flexible to enable continued vendor innovation
- Win – Win strategy
  - RailPulse: open & common interface speeds vendor integration
  - Device Vendors: interface investment supports global market (vs just NA)





# QUESTIONS?

**LEADING THE TECHNOLOGY TRANSFORMATION FOR RAIL SHIPPING**