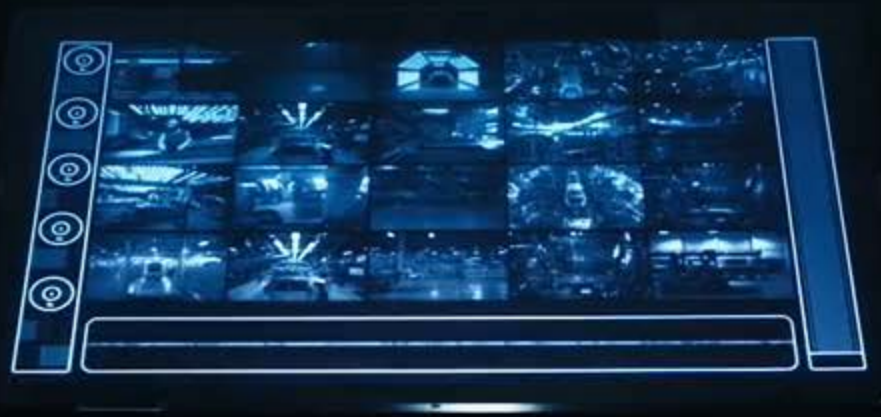


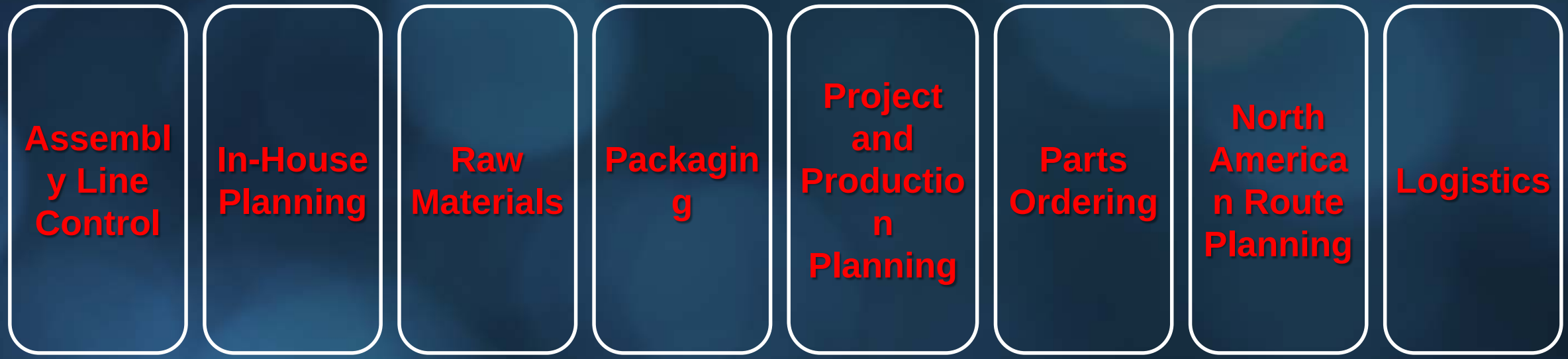

TOYOTA

TOYOTA

Renee Robertson

General Manager, Production Control
Toyota Motor Manufacturing Kentucky

TMMK Production Control



Index of Topics:

- Regional Toyota Overview
- Logistics at TMMK
- Toyota Approach to Safety
- The Future of Mobility

Regional Toyota Overview

Toyota USA:

2.4M Vehicles sold in 2018

10 Manufacturing Plants

$27.3B Invested

1,500 Dealerships

~179K Employees

Toyota Motor Manufacturing Kentucky (TMMK):

Groundbreaking: May 1986

~ 8,000 team members

Annual capacity:

550,000 vehicles
600,000
engines

Toyota's largest plant in world!

WELCOME TO GEORGETOWN -

HOME OF TEAM KENTUCKY

- Powertrain
- Production Engineering Manufacturing Center
- Line 1 (Camry/Avalon)
- Line 2 (Camry/ HV/RAV)
- Die Manufacturing
- Paint Reborn
- LEXUS
- Kentucky Support Center
- Marshaling Yard
- Plastics

Fully Integrated

STAMPING → BODY WELD → PAINT → PLASTICS / POWERTRAIN → ASSEMBLY

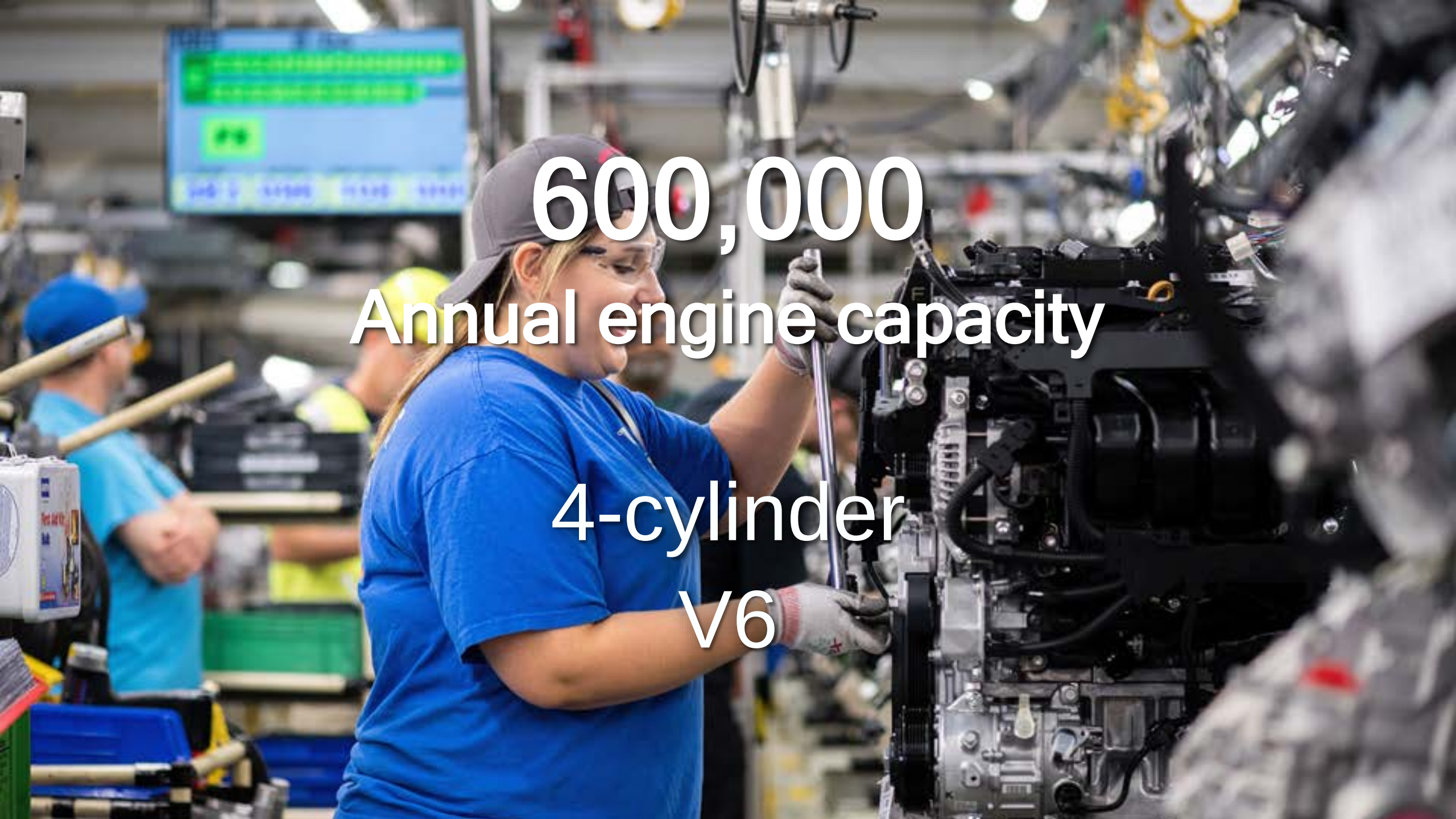
20 hours production time

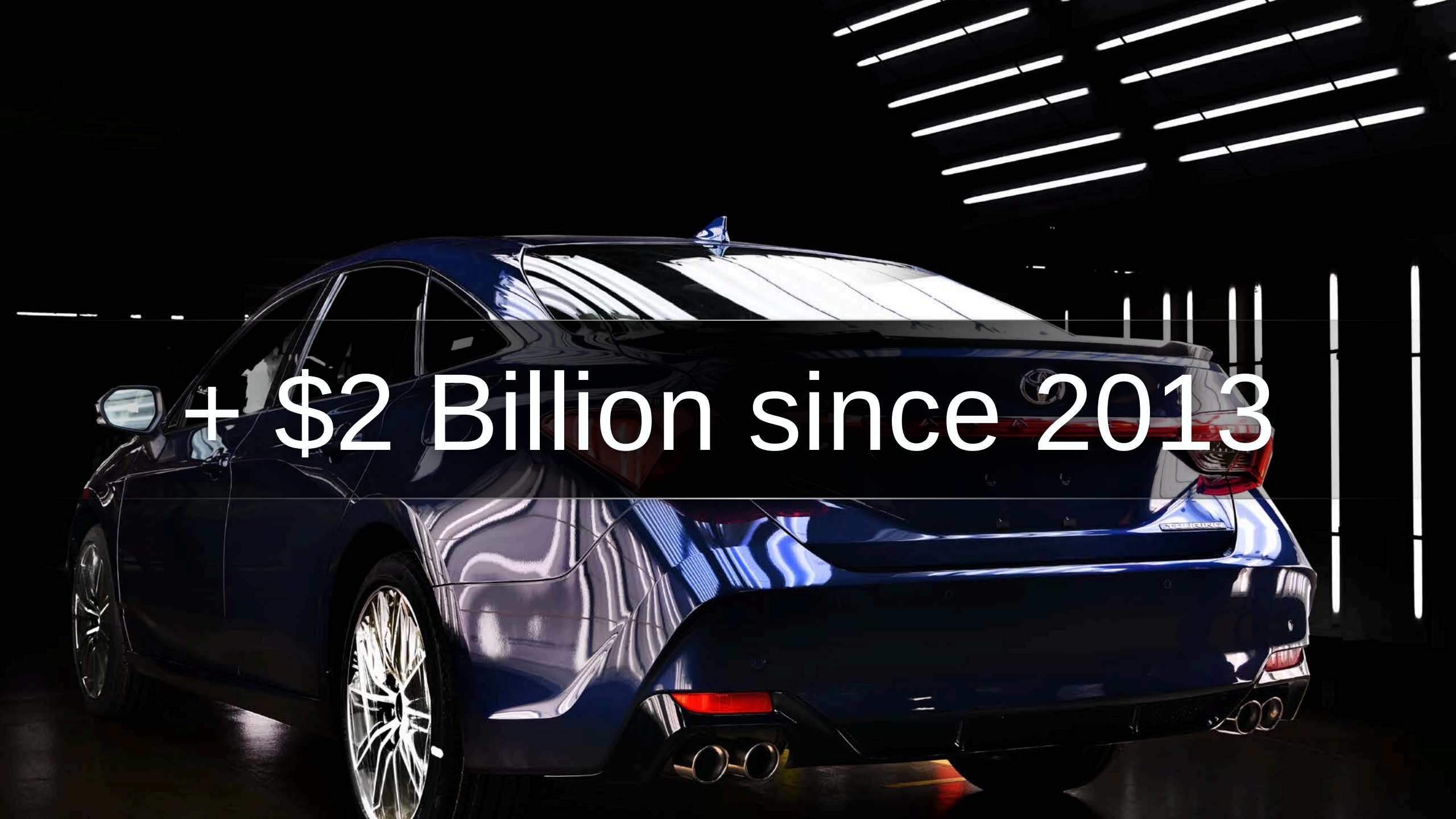

#1 PASSENGER CAR
17 Years in a Row
Camry


Avalon


LEXUS


Coming in Jan 2020…
RAV4 Hybrid


600,000
Annual engine capacity
4-cylinder
V6


+ $2 Billion since 2013

Toyota New Global Architecture (TNGA)

Common Process.

Common Parts.

Ever-Better Vehicles.

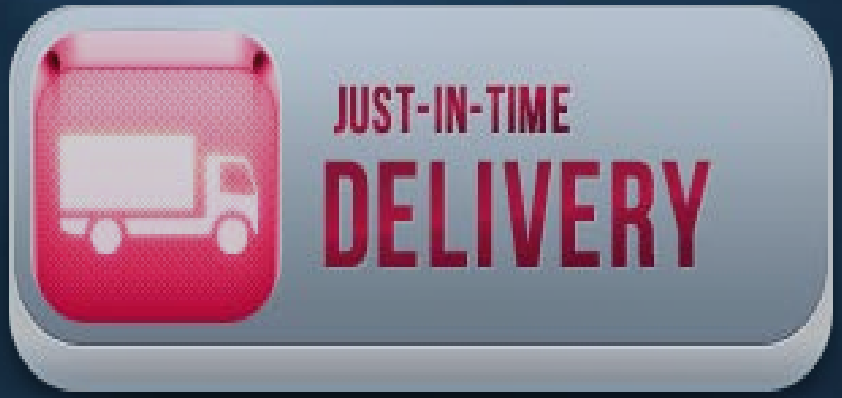
Enables greater flexibility and responsiveness to market changes.

Logistics

Just-In-Time (JIT) System

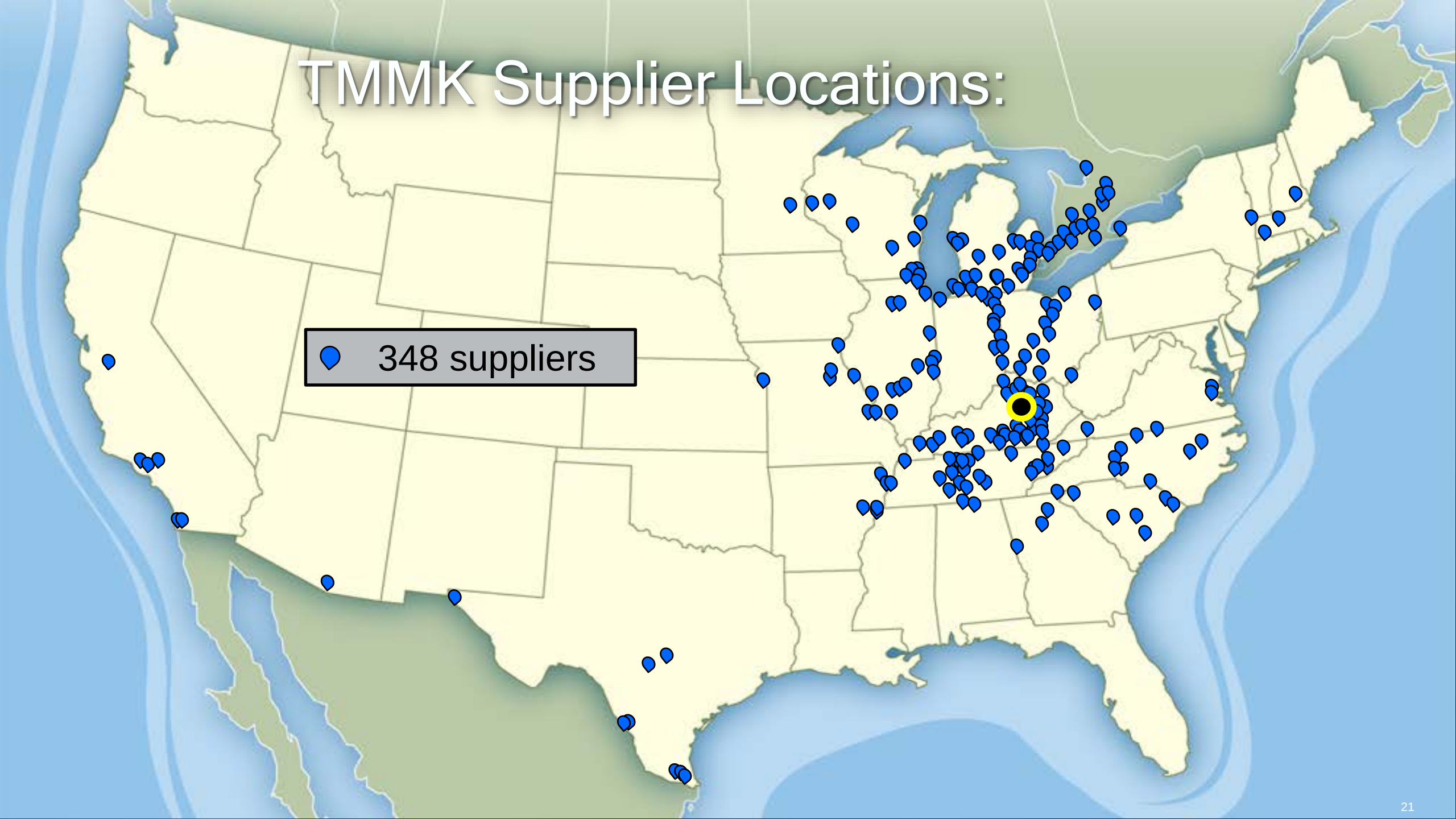
Making only what is needed, when it is needed, and in the amount needed

JIT Method for Supply Chain Management at Toyota:
Movement of material to a specified location at the required time and volume needed to run production

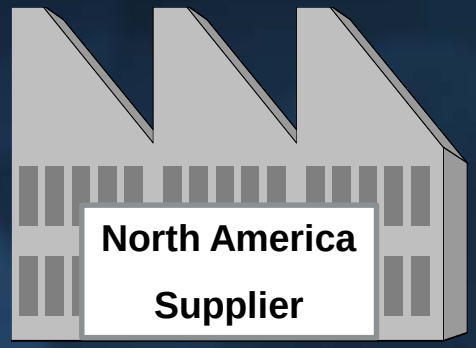


Key Roadways Used by TMMK Suppliers:

TMMK Supplier Locations:



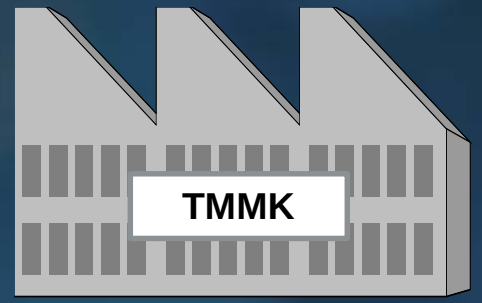
TMMK Supplier Overview



<u>Direct Routes</u> - High Volume / Frequency

25,550 m3

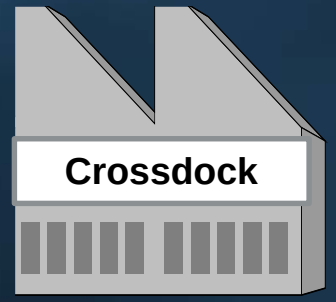
73%

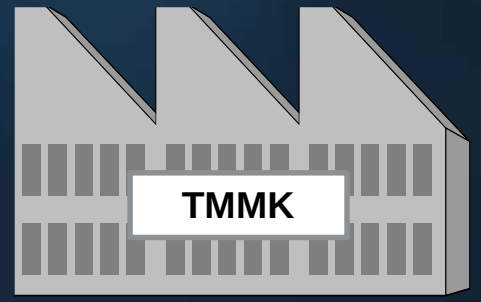


<u>Network Routes</u> - Low Volume Suppliers

9,450 m3

27%



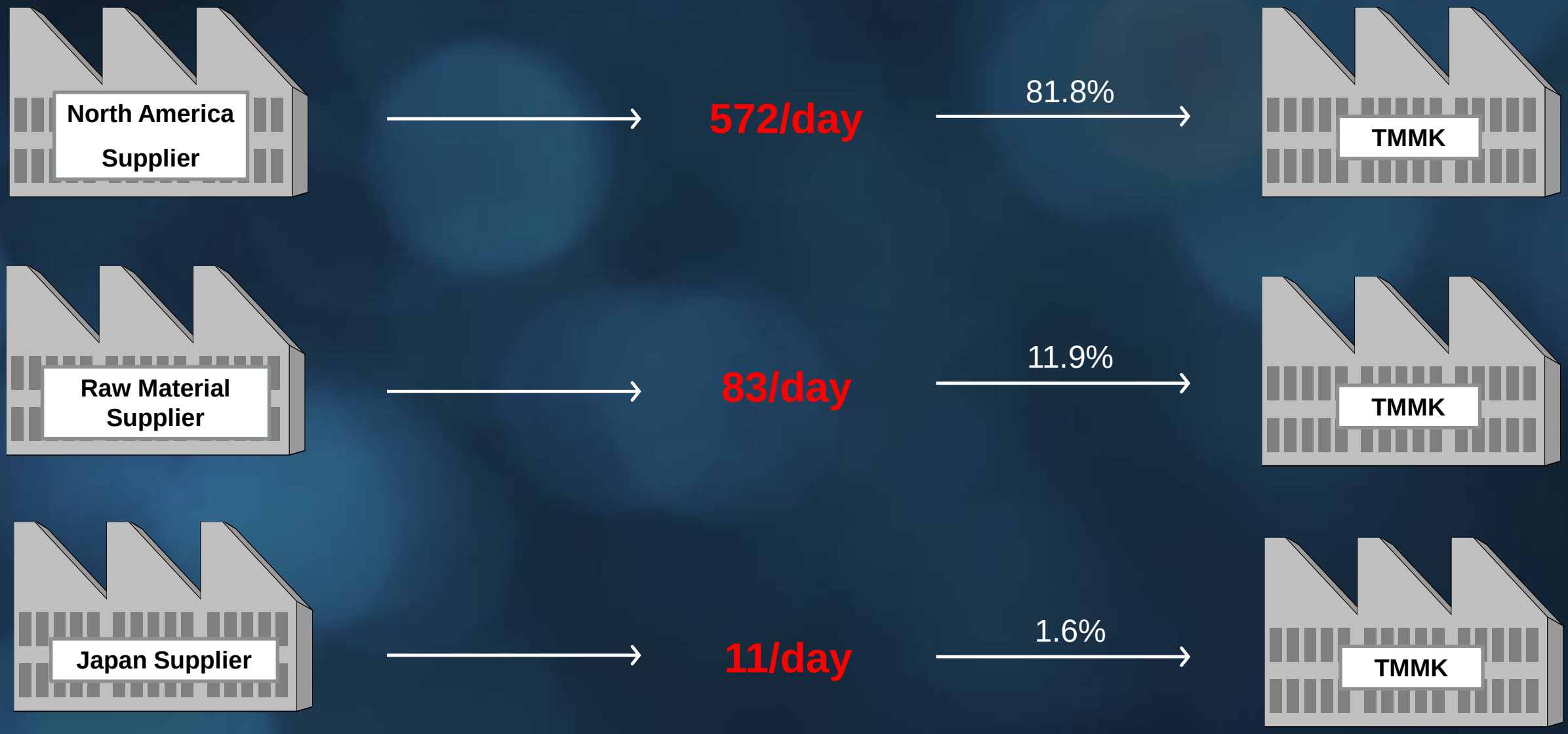


TMMK Parts Logistics:

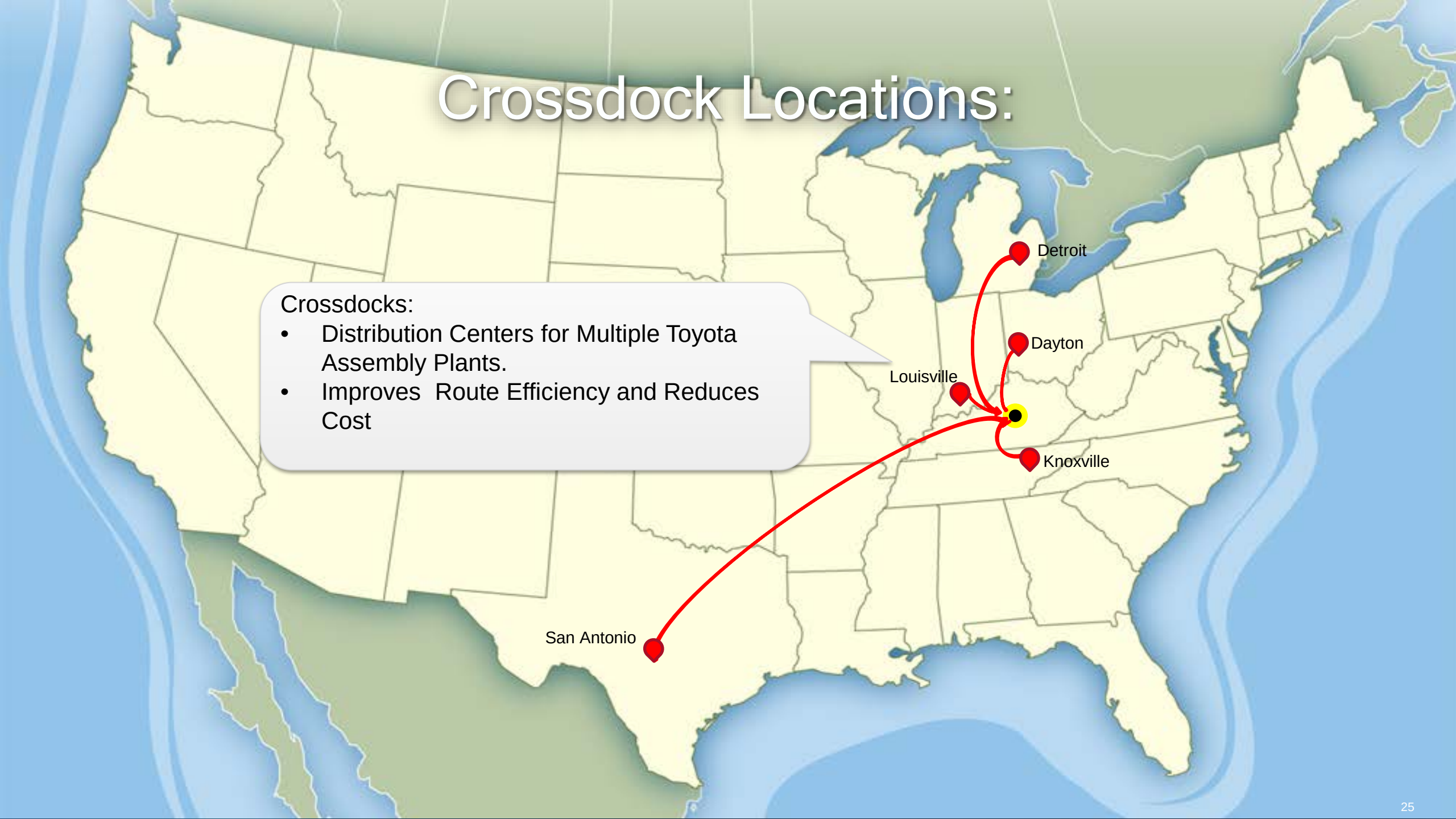
- **4** Logistics Partners to Run Daily Routes
- **35,000 m3** of Cargo Moved Each Day
- **161,000** Miles Driven Daily

6.5 trips around Earth!

TMMK Logistics Overview



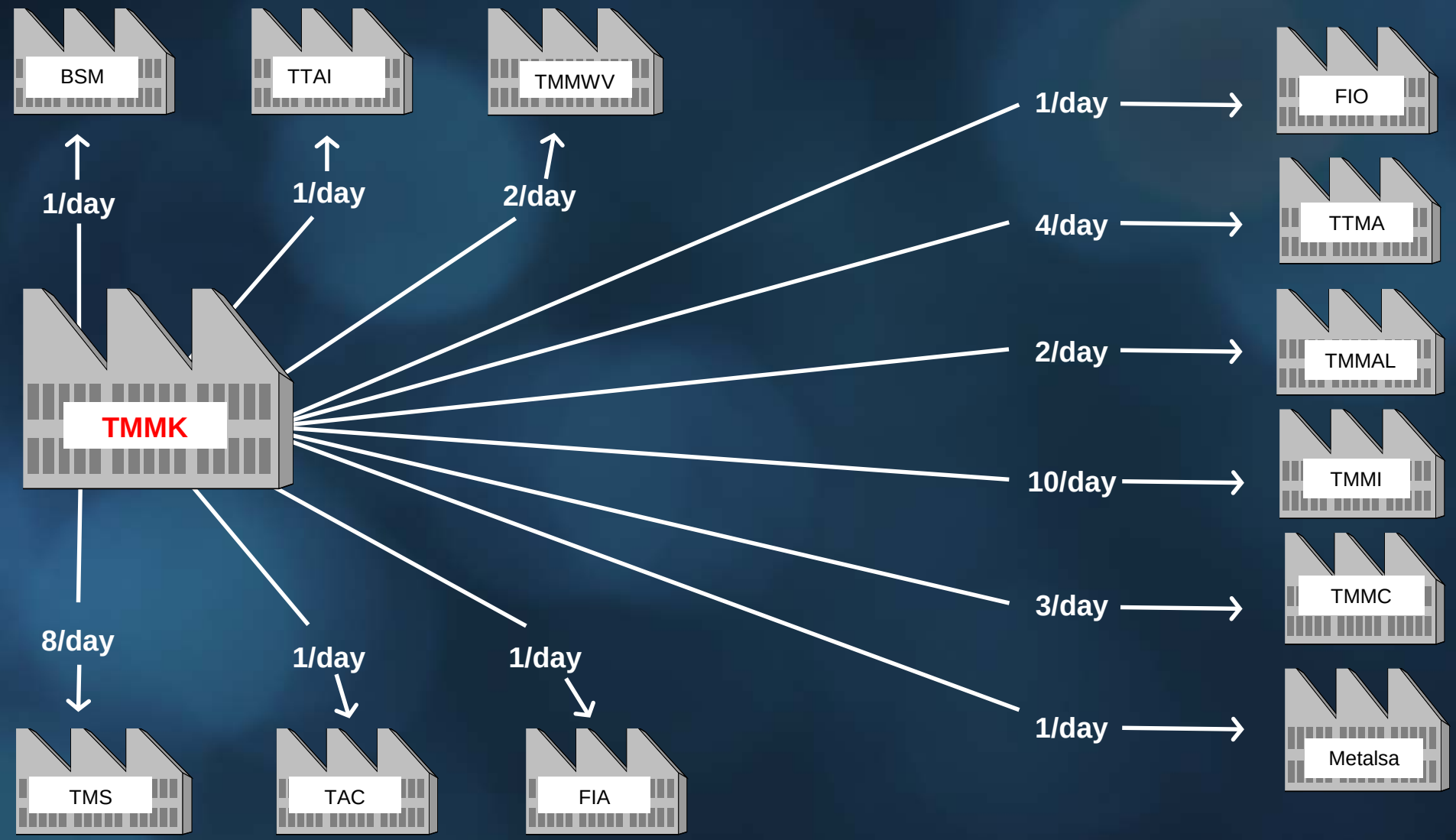
Crossdock Locations:



Crossdocks:

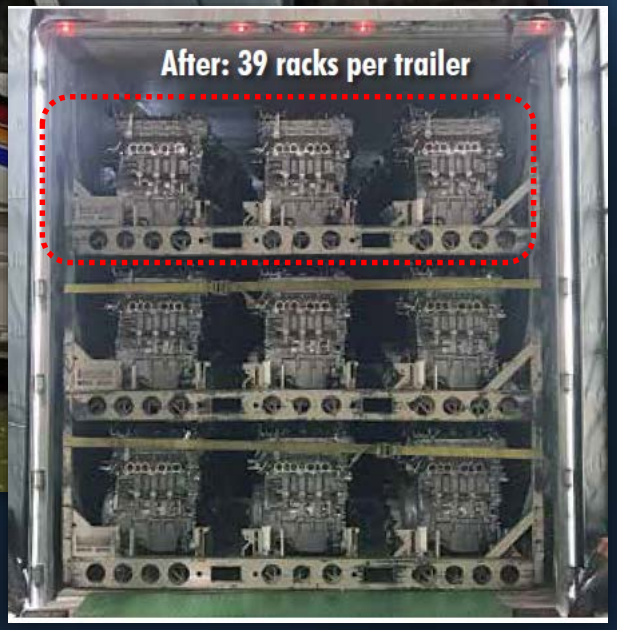
- Distribution Centers for Multiple Toyota Assembly Plants.
- Improves Route Efficiency and Reduces Cost

Daily TMMK Shipping Logistics:



Heavy Haul Kaizen Proposal

State by State Max Weight Restriction

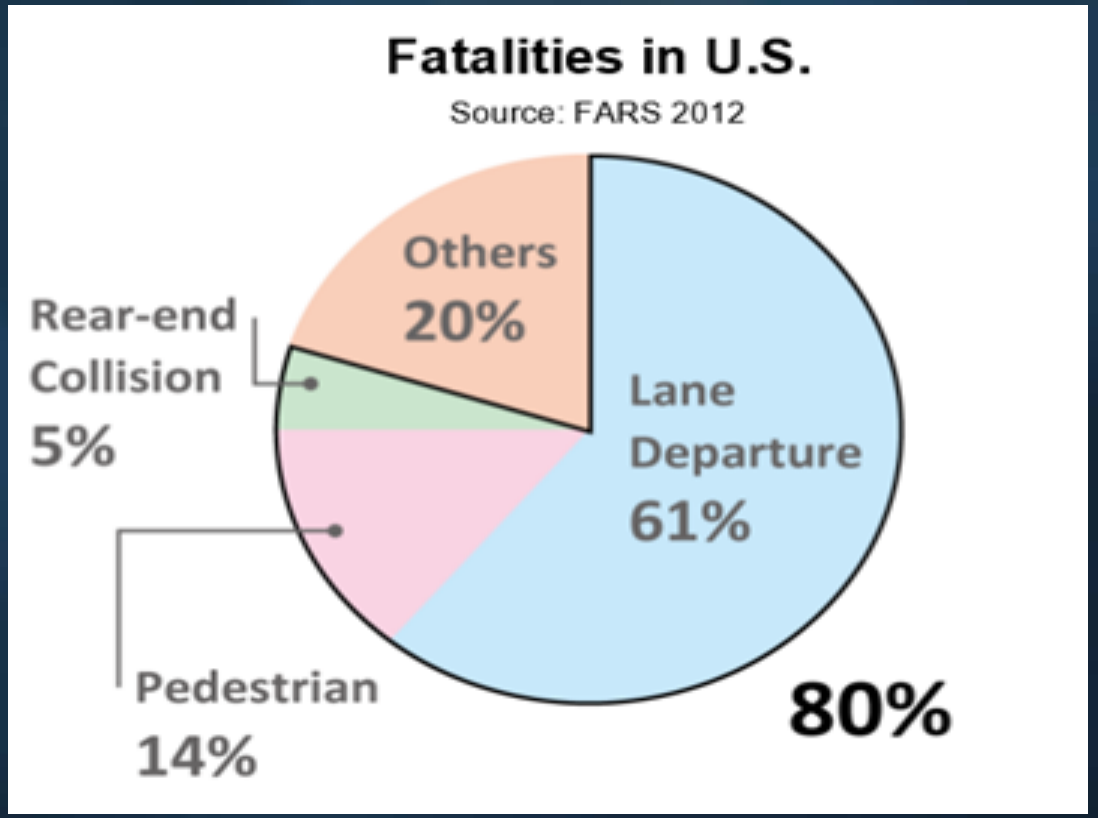


Safety

Toyota Safety Sense™

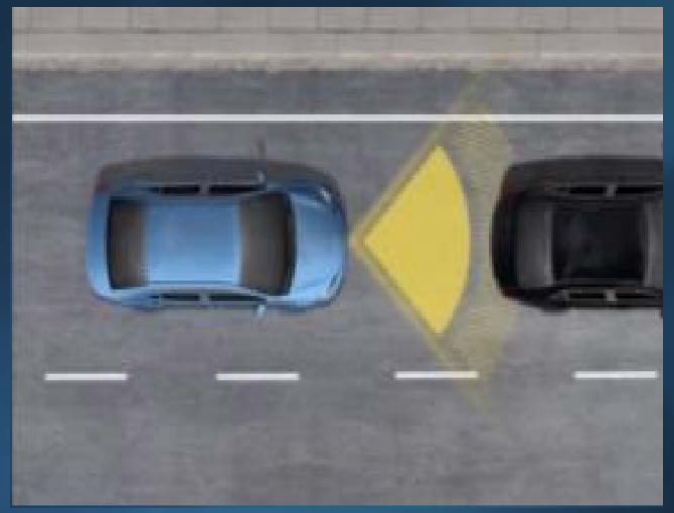
Three (3) most common types of accidents:

- Frontal Collisions (Rear-end)
- Unintended Lane Departure
- Nighttime Visibility



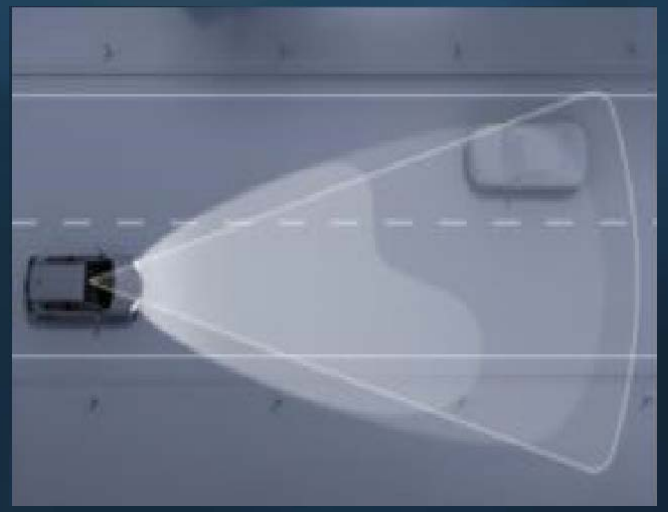

Toyota
Safety
Sense

TSS addresses the 3 most common causes of roadway accidents...



Frontal Collisions

Unintended Lane Departures



Nighttime Accidents


10+ Million
70%

Back to the Future

Back to the Future

2050 is as far away today as the mid 80's

Key Area for 2050: Artificial Intelligence

- Brain-like Microchips
- Decision Making
- Machine Learning
- Materials Informatics
- Quantum Computing
- Robotics and Human-Machine Interfaces (HMI)

The Future

Autonomy

Electrification

Mobility as a Service

Autonomy


TOYOTA
RESEARCH INSTITUTE

Toyota safety technology development and deployment

MOBILITY TEAMMATE CONCEPT

Automated Driving Tech.

- Vehicles adapt to drivers,
- Watch over each other,
- Team-based relationship – helping each other

TOYOTA
RESEARCH INSTITUTE

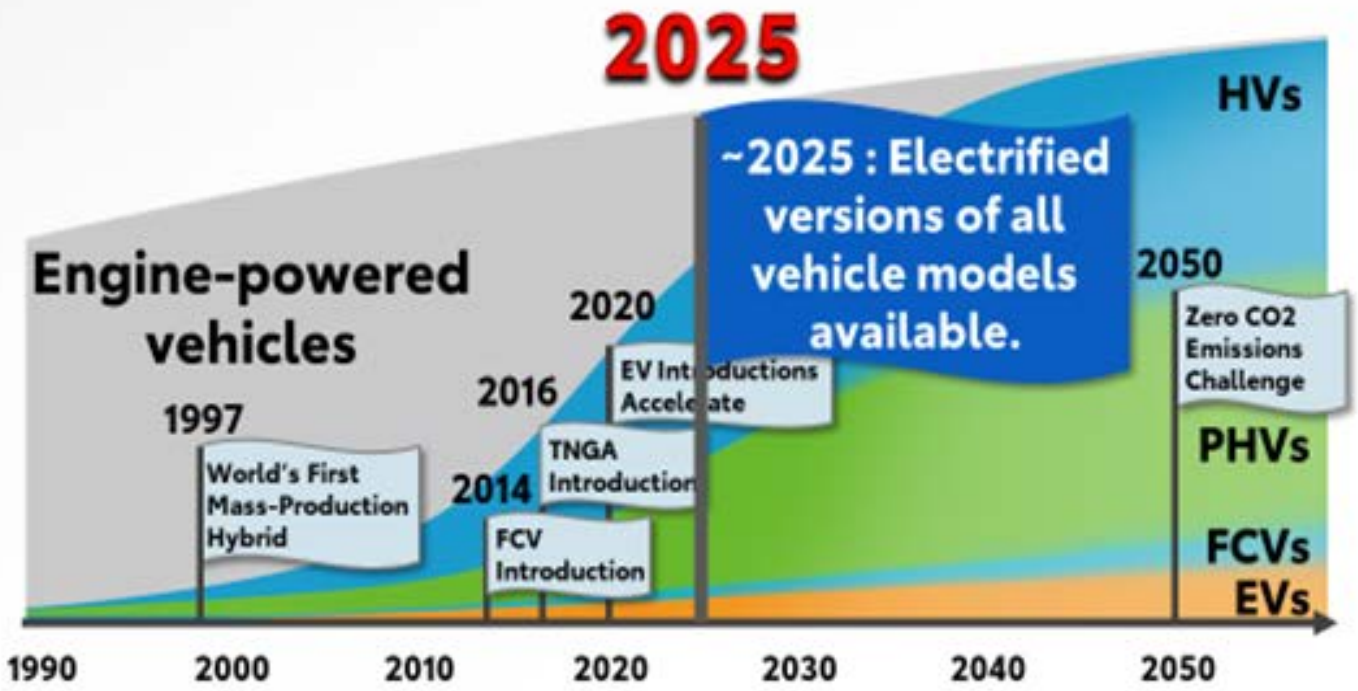
Guardian Mode

Chauffeur Autonomy

Electrification

TOYOTA

Vehicle Electrification Commitment



Electrification

Toyota has developed electrified vehicles with low or zero CO2 emissions. It plans to:

- By around 2030, Toyota aims to have sales of more than 5.5 million electrified vehicles, including more than 1 million zero-emission vehicles (BEVs, FCEVs)
- By around 2025, every model in the Toyota and Lexus line-up around the world will be available either as a dedicated electrified model or have an electrified option
- Have 10 BEV models available worldwide by the early 2020s.
- Reduce vehicle CO2 emissions by 90 percent in comparison with 2010 levels by 2050.

60% are Toyota or Lexus

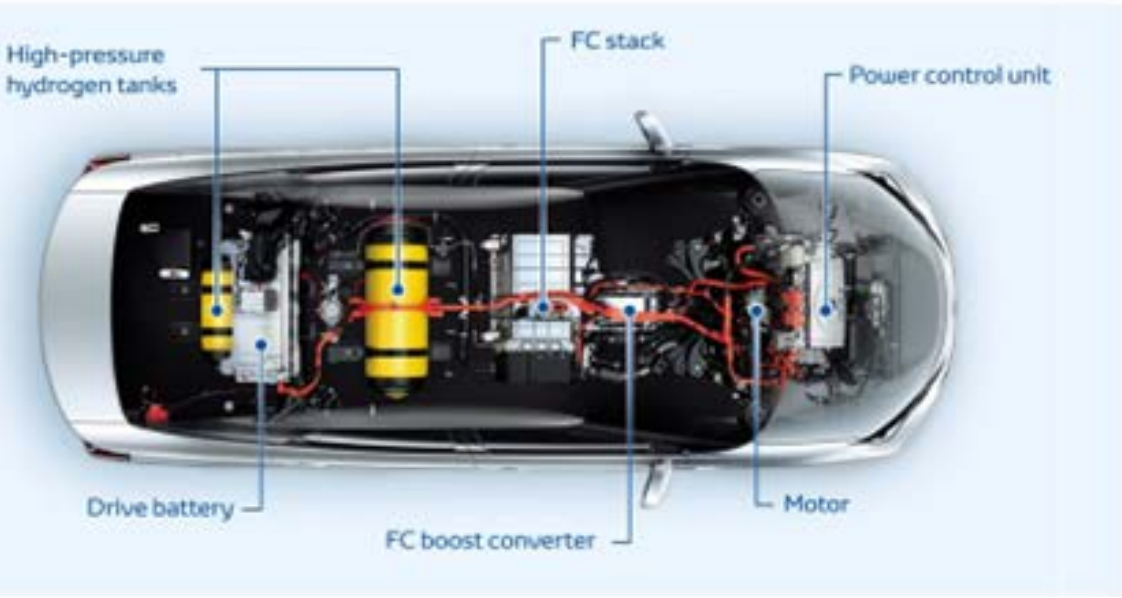
Hydrogen

Long Range

Fast Fueling

Scalability

Mirai



Toyota's Mirai is the first mass-produced **hydrogen fuel cell electric** vehicle.

- It is a four-door, mid-size sedan, and the **only zero-emission hydrogen vehicle on the market that tops the 300-mile range milestone**.
- The vehicle uses hydrogen, oxygen and a fuel cell, and **emits nothing but water vapor** in the process.


FUEL CELL
H2

PORTAL Project

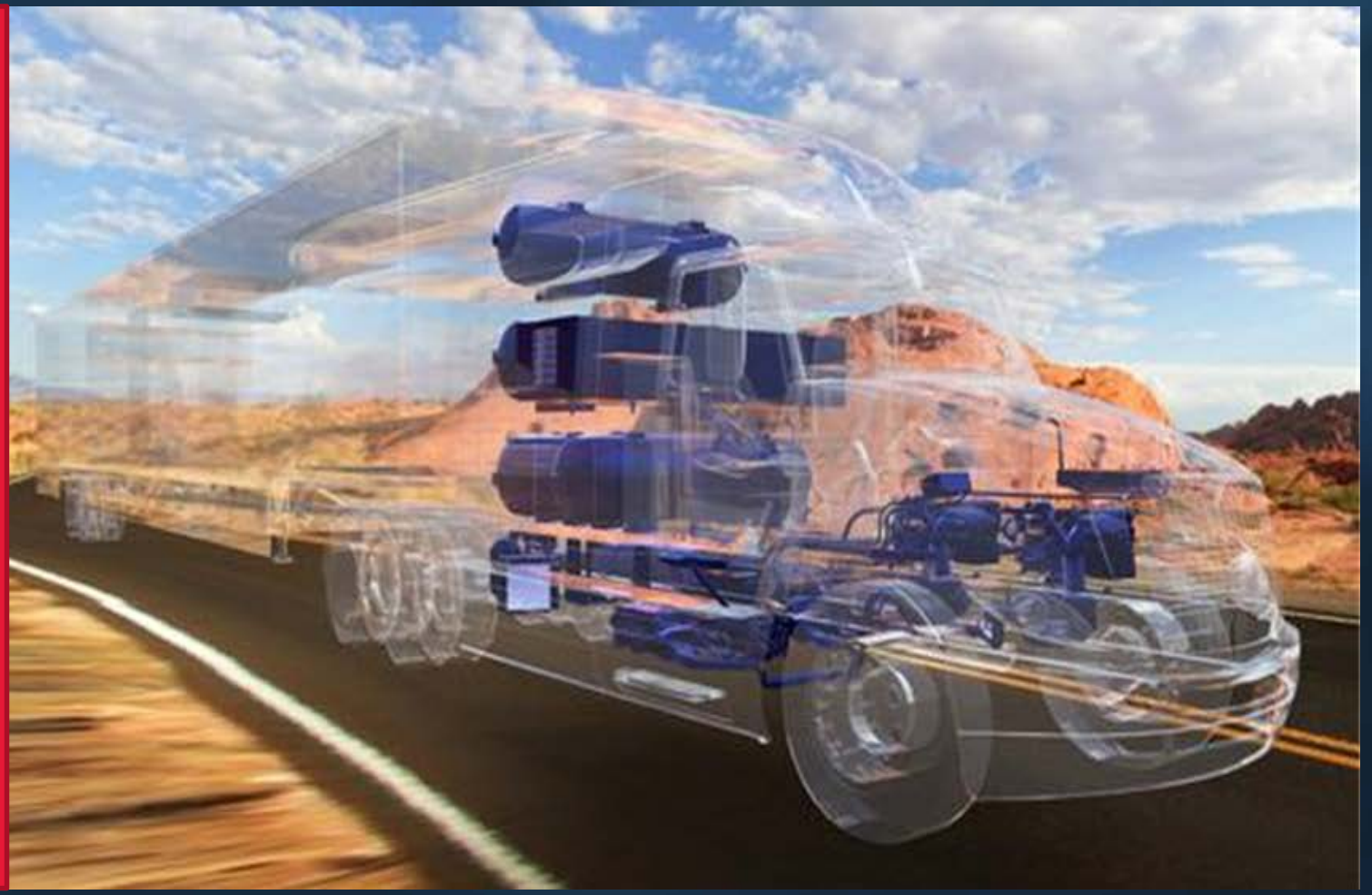
Prototype Truck:

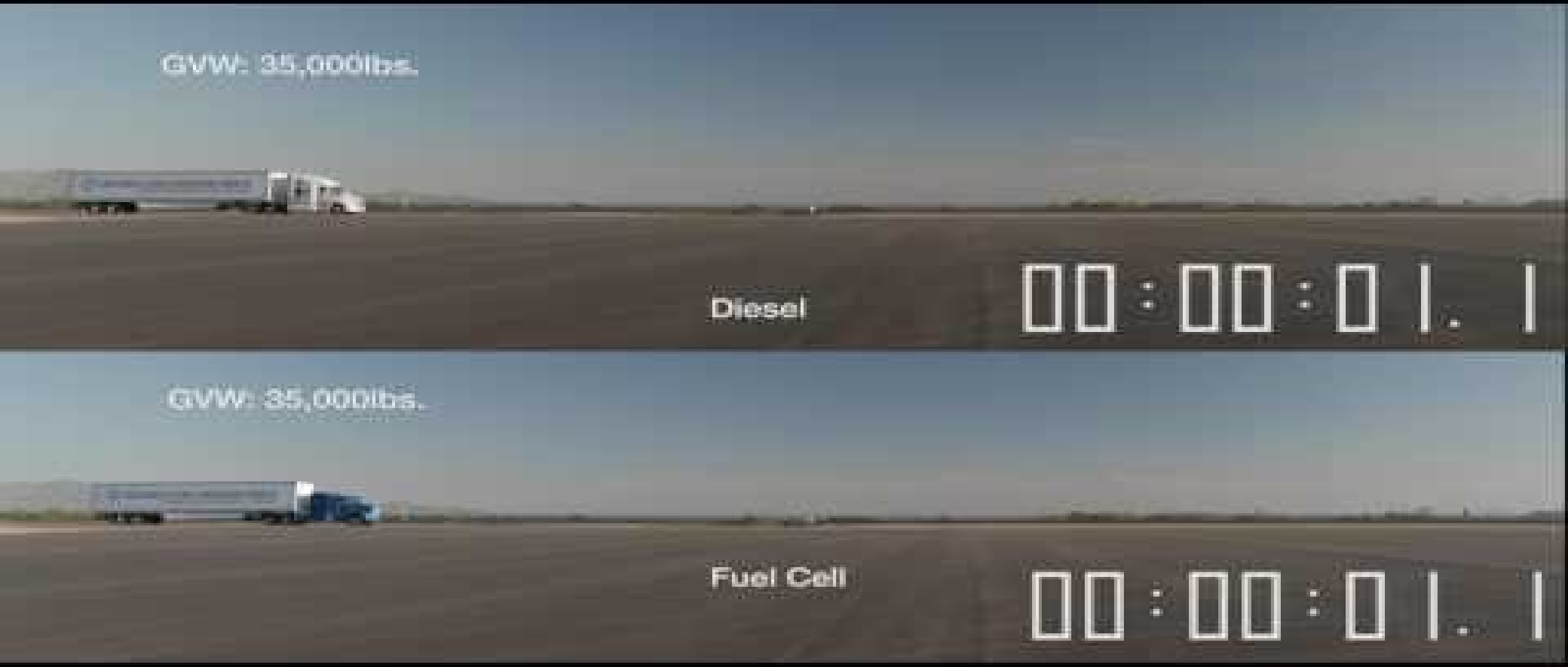
Specifications

- Class 8 truck chassis
- 2 Mirai fuel cell stacks
- 12 kWh of batteries
- 700 bar storage

Performance

- 670 horsepower
- 1375 lb-ft torque
- 80,000lbs GVWR
- 200+ miles of rage




GVW: 35,000lbs.
Diesel
00:00:01.1
GVW: 35,000lbs.
Fuel Cell
00:00:01.1

14,000+

Miles Logged

0

Emissions

Personal Vehicle Ownership

Ride Hailing

Car Sharing

Can we Predict the Future?

"Trying to predict the future is like trying to drive down a country road at night with no lights while looking out the back window"

Key Area for 2050: Ubiquitous Connectivity

TOYOTA

Renee Robertson

General Manager, Production Control
Toyota Motor Manufacturing Kentucky

THANK YOU


TOYOTA