

# WHAT WE'LL COVER

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WHO WE ARE

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DIGITAL  
PRODUCT

03

DIGITAL  
FEATURES

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Solutions Manager

# 01

**WHO WE ARE**



# 100 YEARS OF INNOVATION

**1919**

Cummins founded in Columbus, IN



**1935**

Diesel-electric locomotives produced



**1963**

First Cummins powered Generator



**1986**

Cummins acquires Newage International Ltd, which became the manufacturer of the STAMFORD® and AvK® brands of alternators

**1995**

Cummins forms JV with Chongqing to produce HD and HHP engines in China

**2005**

First electronically-controlled maritime engines and first to EPA Tier 2

**2014**

Introduction of Cummins' largest genset, the QSK95 Series



**2016**

Power Systems Business Unit formed, combining high horsepower engines and power generation



**2019**

100th anniversary of Cummins

**2021**

15 million hours of Tier 4 engines in operation

**2021**

Launched PowerBloc™ product range that delivers an all-in-one solution for data centers

**1920**

Onan founded in Minneapolis, MN



**1960s**

Automatic transfer switches and paralleling switchgear introduced

**1970s**

Cummins produces the first modern compact marine inboard diesels



**1992**

Cummins acquires Onan



**1998**

Fully-electronic 2700 hp QSK60 introduced for Mining applications



**2011**

Introduction of Cummins' largest engine, the QSK95



**2014**

Web-based remote monitoring of gensets released with PowerCommand 500/550

**2019**

Introduction of PrevenTech™ digital monitoring and reporting solution

**2020**

100th anniversary of power generation



**2021**

Introduction of PowerCommand® X-Series transfer switches, the next generation of reliable power transfer equipment



## DIVERSE MARKETS

# CUMMINS WORK WITH CUSTOMERS IN ALMOST EVERY INDUSTRY IMAGINABLE



**MINING**



**MARINE**



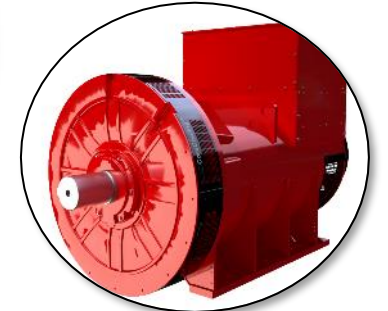
**OIL & GAS**



**RAIL**



**DEFENSE**



**CUMMINS  
GENERATOR  
TECHNOLOGIES**



**MOBILE  
POWER**



**INDUSTRIAL  
POWER**



**MISSION  
CRITICAL  
POWER**



**DATA  
CENTERS**



**ENERGY  
MANAGEMENT  
SOLUTIONS**

## MINING

# CONSTANTLY BREAKING NEW GROUND

### APPLICATIONS

- 100T - 400T haul trucks
- Hydraulic excavators
- Wheeled loaders
- Underground mining
- Surface miners
- Mining site power solution
- Service and support vehicles

### OFFERINGS

- Emissionized and non-emissionized engines
- Diesel gensets from 10 to 3500kW
- Power range from 49 to 4400 hp
- Engine rebuilds
- New and remanufactured genuine parts
- Service contracts and maintenance agreements
- Remote monitoring – PrevenTech®
- On-site and near-site trained technicians 24 x 7



# 02

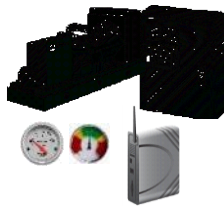
**DIGITAL PRODUCT**



## OUR PRODUCTS

# POWER SYSTEMS DIGITAL

### POWERCOMMAND CLOUD™ Commercial



- Anywhere, anytime up-to-date health and performance status
- Fleet, site and asset level insights
- Event, annunciator data and telemetry analysis
- Immediate notification of faults, warnings, key activities through web app, mobile app or email
- Remotely start, stop, exercise and clear faults
- Create maintenance schedule reminders based on run hours or date

### CONNECT CLOUD™ Consumer

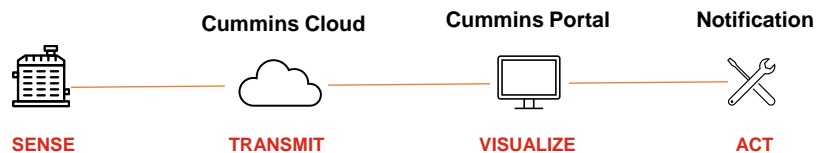


- Simplified mobile-first customer experience
- Remotely start, stop, and clear faults
- Remotely set and monitor exercise routines
- Android, iOS mobile apps

### PREVENTECH™ Industrial



- Applies connectivity, big data, and advanced analytics together with live engine expert support for customized recommendations
- Tracking performance to improve productivity with actionable insights
- Lowers costs by extending maintenance intervals using condition-based thresholds
- Advanced detection of critical engine situations improves equipment uptime





# What does Mining Customer need from Cummins?

$$\downarrow \text{Cost of Production (\$/ton)} = \frac{\downarrow \text{Total Cost of Ownership (\$/hour)}}{\uparrow \text{Productivity (ton/hour)}}$$

- Reducing Total Cost of Ownership through:
  - Extended Service Interval
  - Operational efficiency
- Increasing Productivity through:
  - Unplanned to planned downtime (Prognostics)
  - Reduced troubleshooting time (Optimized Diagnostics)
  - Active Monitoring

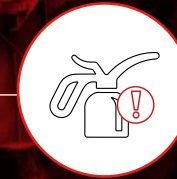
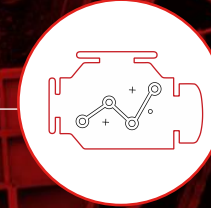
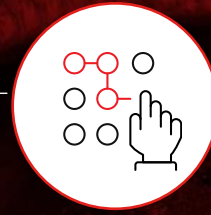
# 03

**DIGITAL FEATURES**



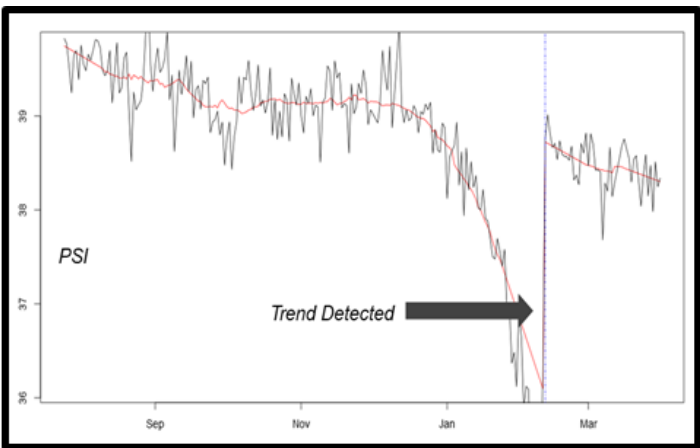
# Technical Features

- Equipment Map
- Alert Notifications
- Engine Data Log
- Graphing
- Equipment Histories
- Prognostics
- Assisted Monitoring
- Web-Based User Interface
- Data Encryption

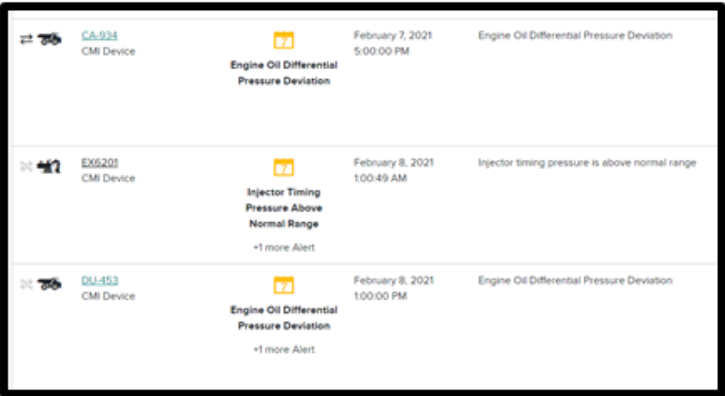


# Types of Insights

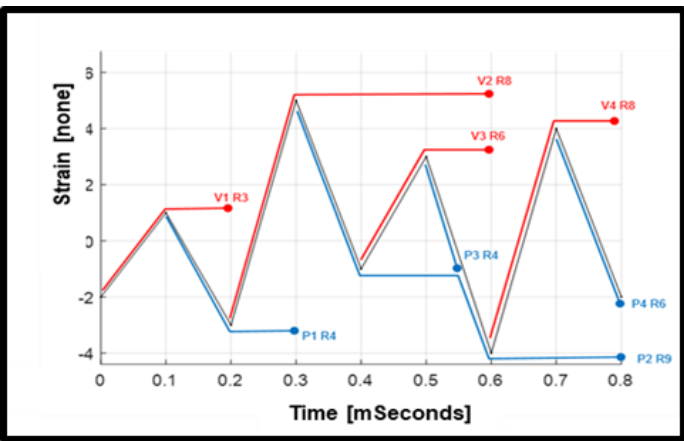
## 1. Basic Statistical Model



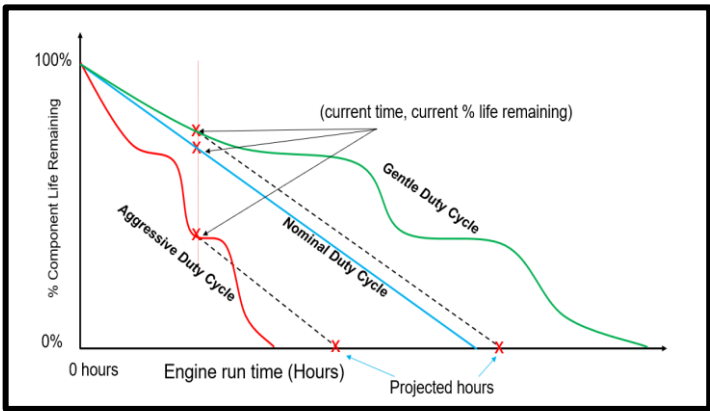
Component failure detected



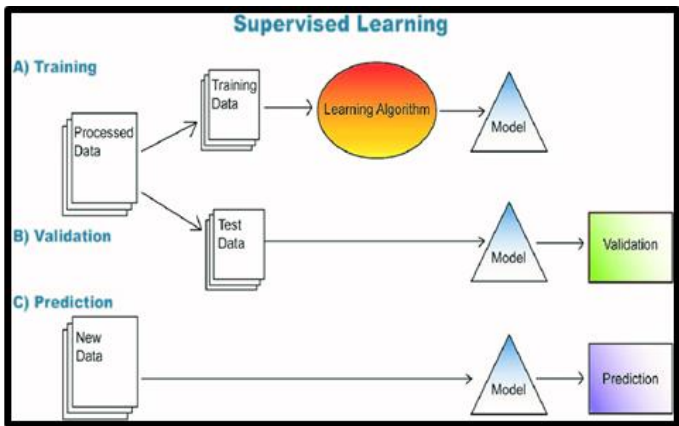
## 2. Physics Based Model (Damage Map )



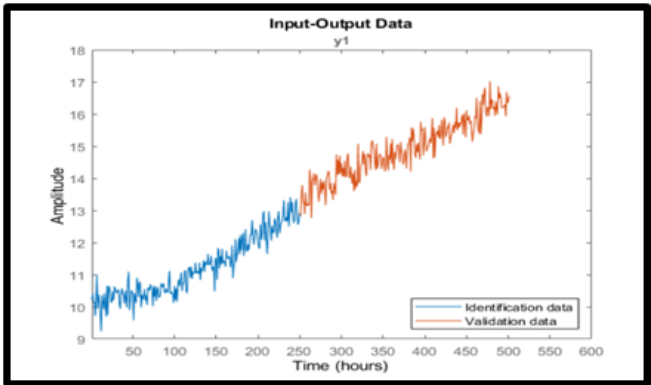
Component Life Estimation



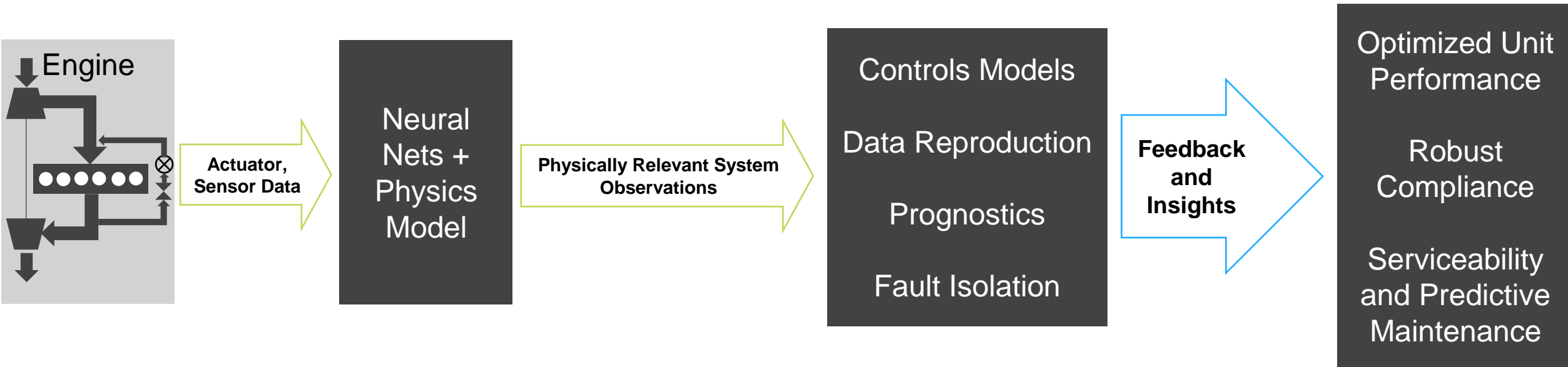
## 3. Machine Learning Model



Component failure Predicted



# Example – Physics Inferred Neural Networks



- The broader field of mixing knowledge of physics, data, and machine learning. Some common forms used are:
  - Tightly integrated models predicting solutions to differential equations
  - Using physics models to generate data to train ML models
  - Constraining ML models using physics
  - Using ML solvers against differentiable physics models