GM: Data and its challenges

6th SmartData@Polito | 31st January 2020

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Zero Crashes
Zero Emissions
Zero Congestion

*"I believe the **auto** industry **will change more in** the **next five** to 10 **years than** it has **in the last 50**, and this gives us the opportunity to make cars more capable, more sustainable and more exciting than ever before"*

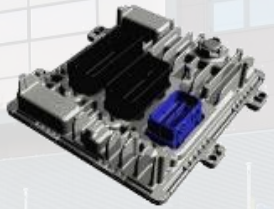
M. Barra, General Motors CEO (2016)

GM GPS Torino

Propulsion

Global responsibility for propulsion systems

Electronics and SW



HW, Integrated circuits and SW full **In-House** development

Machine Learning

Data Analytics

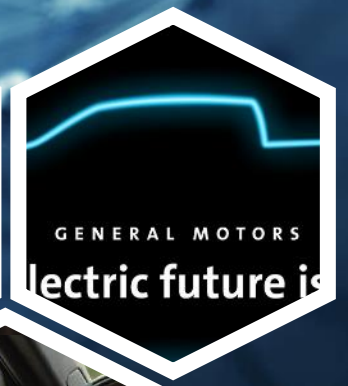
Additive Manufacturing

Blockchain

Areas of interest

Human factors

Vehicle data analysis

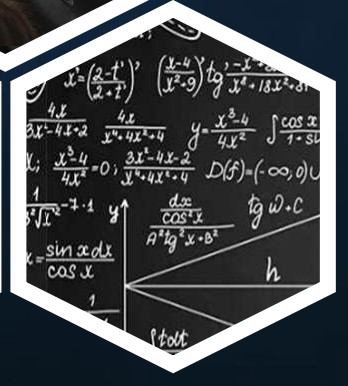


Mobility

Customer learning

Prognostics

Text mining



Human Factor

- Physiological measurements
- Video recording

→ Predict the psychophysical status of the occupants

Key points:

- **Machine learning**
- **Signal processing**
- **Medical support**

Challenges:

- **Instrumentation development**
- **Data cost, quality and variety**
- **Subjective physiology**
- **Cross-disciplinarity**

Mobility

- Hystorical data
- Weather forecast/Event calendar

→ Predict the user demand

→ Define the optimal design and policy

Key points:

- **Machine learning**
- **Signal processing**
- **Statistical modelling**
- **Genetic algorithm**

Challenges:

- **Data cost, availability and quality**
- **Data segmentation**
- **System complexity**

Prognostic

- Multivariated time series
- Statistical value
- Categorical values

→ Predict the system failure and state of health

Key points:

- **Machine learning**
- **Signal processing**
- **Statistics**

Challenges:

- **Experimental set VS real life**
- **Customer impact**
- **Business case**

Data analysis

- Remote telemetry from cars on field
- Test fleet data

→ Anticipate issues on the field

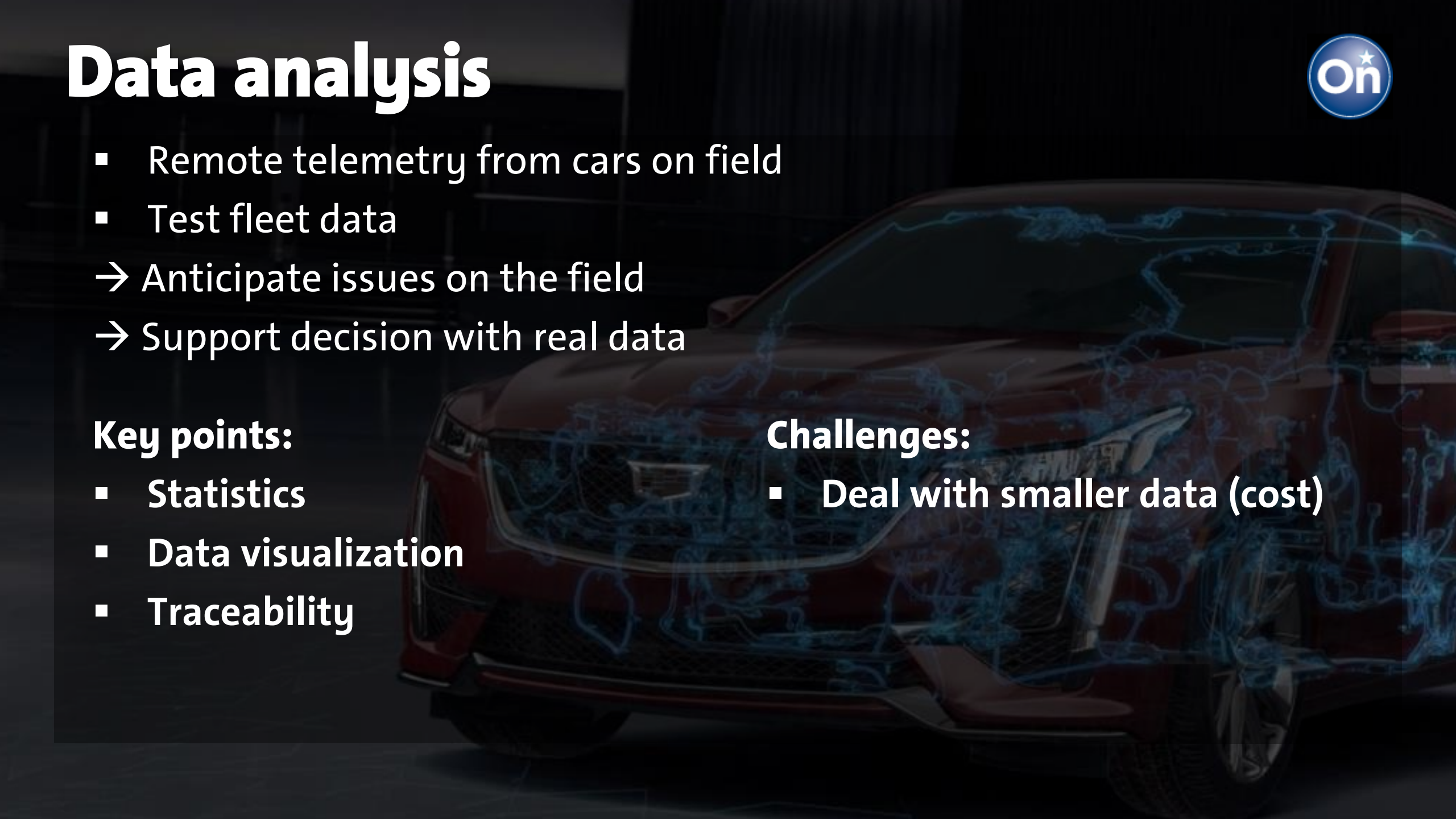
→ Support decision with real data

Key points:

- **Statistics**
- **Data visualization**
- **Traceability**

Challenges:

- **Deal with smaller data (cost)**



Customer learning

- Historical usage data

→ Predict the customer requests

→ Responsiveness of the vehicle

Key points:

- **Statistics**
- **Machine learning**

Challenges:

- **Habits repeatability**
- **Customer to customer variability**
- **Embedded unit resources**

Text mining

- Written feedback from customer
- Analysis for Engineering team

→ Extract technical relevant information

Key points:

- **Natural Language Processing**

Challenges:

- **Non technical feedbacks**
- **Slang/Typo**

Contact us!

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Thank you