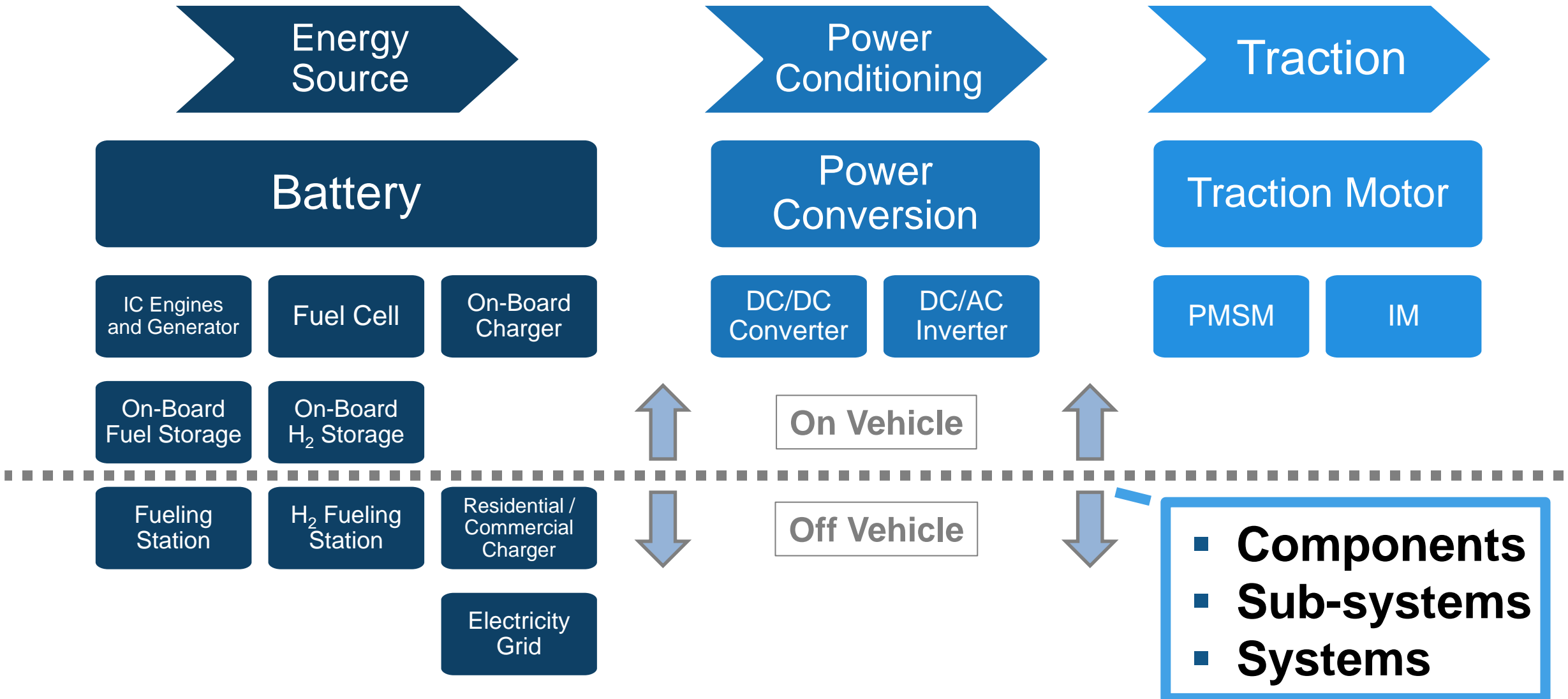# Prototype to Production: Accelerate EV Development

MathWorks®
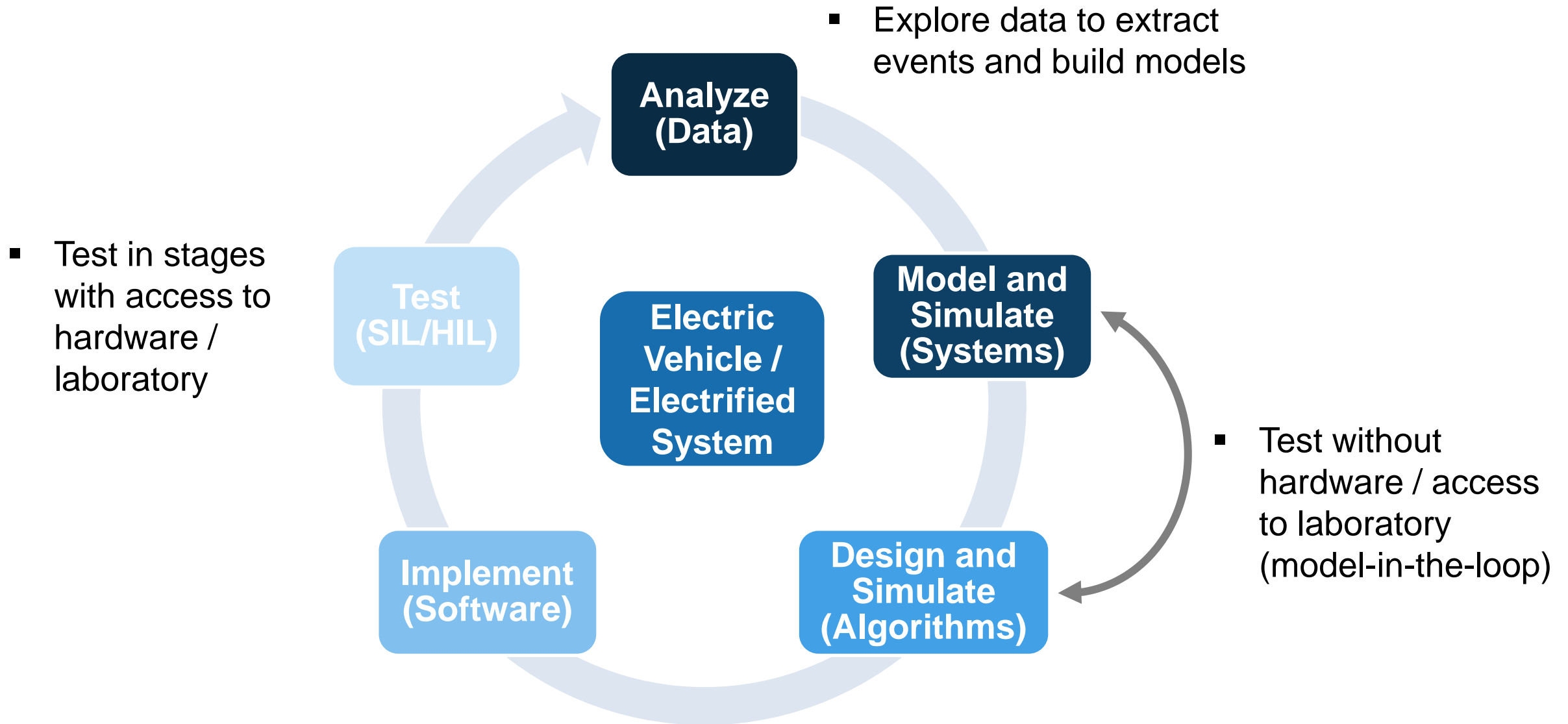
Challenges and Solutions for Developing EVs

- Is the system optimized?   *Perform tradeoff analysis.*

- How to reuse software?   *Develop models rather than code.*

- How to quickly test prototype algorithms?   *Automatically generate code.*

- How to use data efficiently and effectively?   *Explore data to extract events and build models.*

- How to meet ISO 26262?   *Use qualified tools.*

Build Automotive Electrification Technologies with Model-Based Design

Energy Source

Battery

IC Engines and Generator	Fuel Cell	On-Board Charger

| On-Board Fuel Storage | On-Board H_2 Storage | |

Fueling Station	H_2 Fueling Station	Residential / Commercial Charger

Electricity Grid

Power Conditioning

Power Conversion

DC/DC Converter	DC/AC Inverter

On Vehicle

Off Vehicle

Traction

Traction Motor

PMSM	IM

- **Components**
- **Sub-systems**
- **Systems**

Development Process and Areas

- Explore data to extract events and build models

Analyze (Data)

Model and Simulate (Systems)

Electric Vehicle / Electrified System

Test (SIL/HIL)

Implement (Software)

Design and Simulate (Algorithms)

- Test in stages with access to hardware / laboratory

- Test without hardware / access to laboratory (model-in-the-loop)

Why MathWorks?

- Front-load electrified system development through systematic use of data and models.

Tesla Tells Us How It Keeps Beating Nearly Everyone in the Range Game

GREEN TECHNOLOGY / CONTROL SYSTEMS

Removing Millions of Tons of CO_2 Emissions at Seaports Each Year
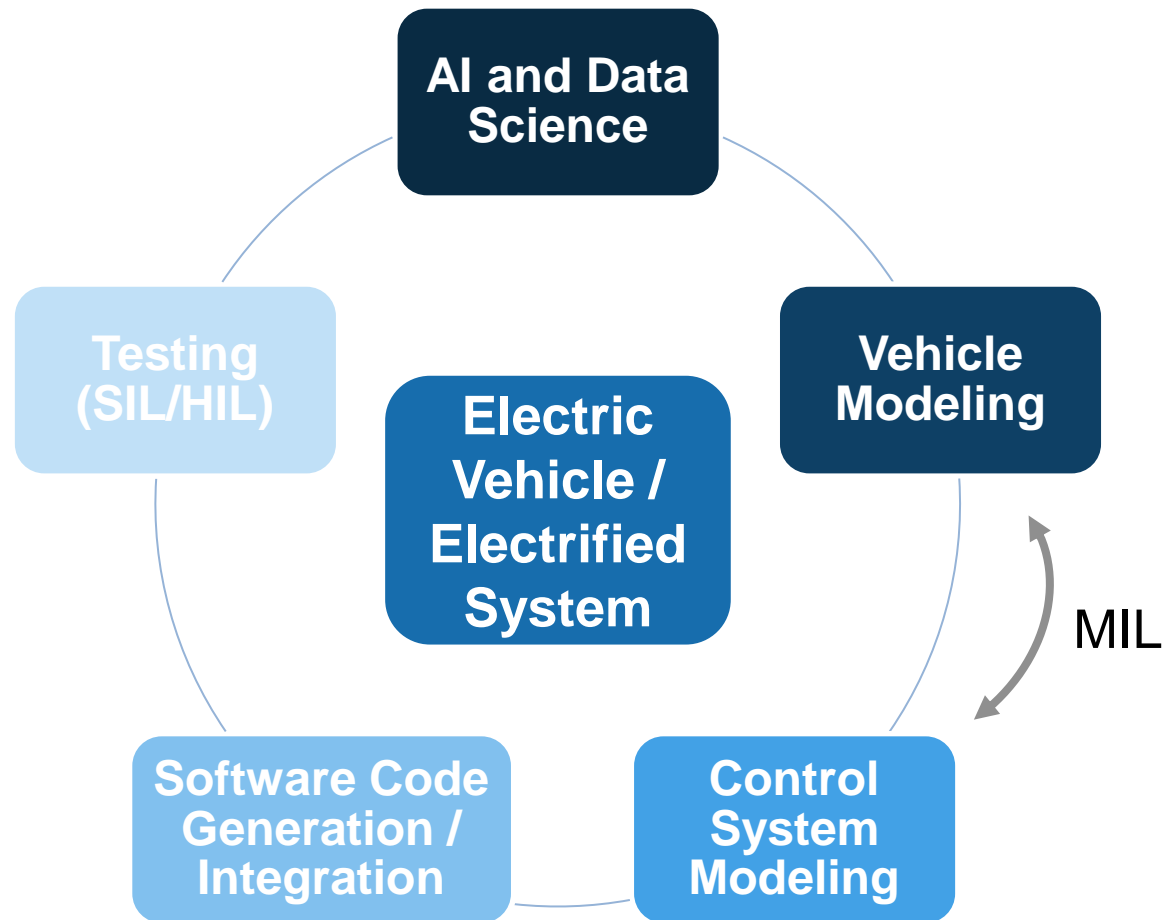
Electrifying Commercial Vehicles with Hydrogen Fuel Cells

AUTOMOTIVE

Romeo Power

Modeling and Simulating Battery Performance for Design Optimization

What is Most Relevant to You?

AI and Data Science

Vehicle Modeling

Electric Vehicle / Electrified System

Testing (SIL/HIL)

Software Code Generation / Integration

Control System Modeling

MIL

- Contact a MathWorks Sales Engineer specializing in Electrification:

Alex Kracht   Ashley Mrutu

- Visit these Solutions pages: Automotive, Power Electronics Control Design, and Power Systems Analysis and Design