Industrial DevSecOps

From Value Streams to Agile Teams

CHAT WITH US LIVE · DURING SESSION

Robin Yeman

LM Senior Fellow
Lockheed Martin

Suzette Johnson

NG Senior Fellow
Northrop Grumman

Introductions

Robin Yeman   **Suzette Johnson**

Industrial DevOps Applied

Companies like Lockheed Martin and Northrop Grumman build life human safety critical like F-35 and the B-2

F-35

B-2

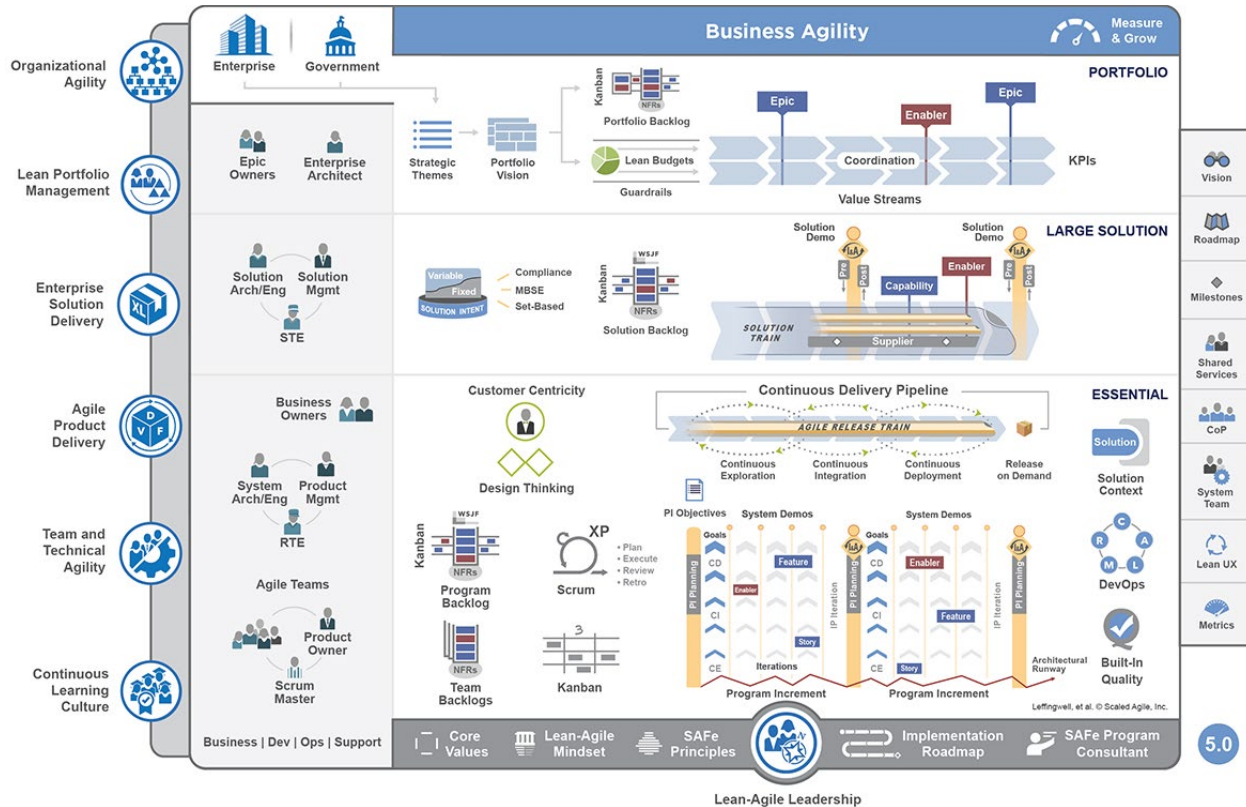# Problem statement for large organizations

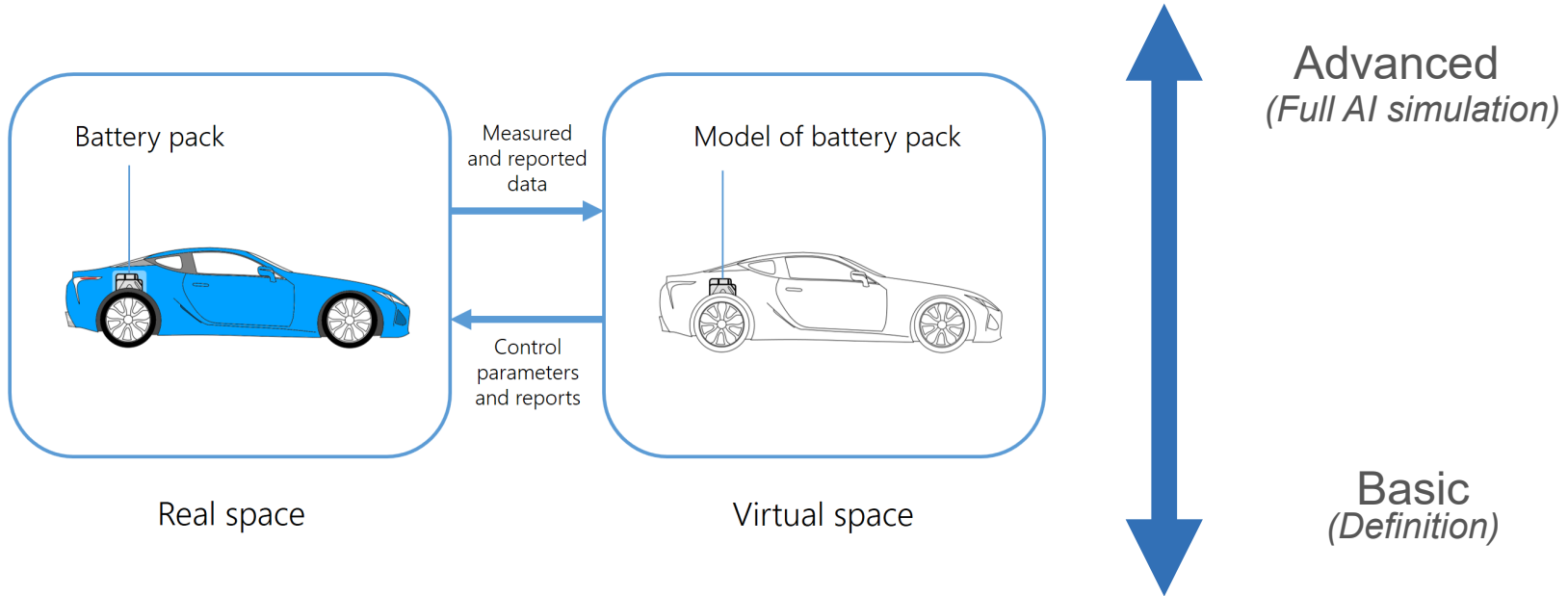| System Context	Cultural Context
▸ System Structure	▸ Organizational Structure
▸ Quantitative Information Flow	▸ Qualitative Information Flows
▸ Heterogeneous Elements	▸ Heterogenous Subculture
▸ Emergent behavior	▸ Mental Models
▸ Interfaces	▸ Relationships
▸ Nomenclature	▸ Language

SAFe and Large Solution

Industrial DevOps Principles

1.   Visualize and organize around the value stream

2.   Multiple Horizons of Planning

3.   Base decisions on objective evidence of system state and performance

4.   Architect for Scale, Modularity, and Serviceability

5.   Iterate / Reduce batch size / Get fast feedback

6.   Cadence and Synchronization

7.   Continuish Integration

"DevOps is a mixture of people, process, and technologies that provides a delivery pipeline enabling organizations to move both responsively and efficiently from concept to business outcome." - Robin Yeman

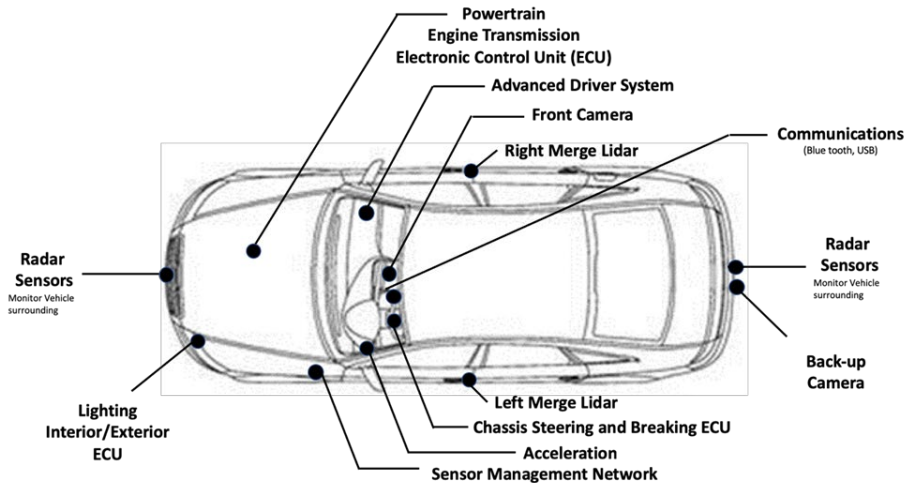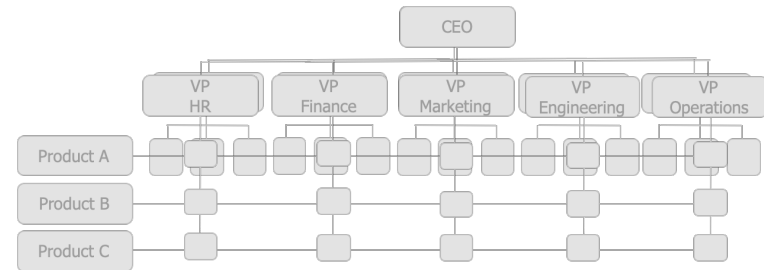# Complete/Partial Digital Thread Enabler

Example: **Autonomous Vehicle**

Autonomous vehicles have similar complexity and human safety details as many of the products that Lockheed Martin and Northrop Grumman currently do.

System Context

- Powertrain Engine Transmission Electronic Control Unit (ECU)
- Advanced Driver System
- Front Camera
- Right Merge Lidar
- Communications (Blue tooth, USB)
- Radar Sensors Monitor Vehicle surrounding
- Back-up Camera
- Radar Sensors Monitor Vehicle surrounding
- Lighting Interior/Exterior ECU
- Left Merge Lidar
- Chassis Steering and Breaking ECU
- Acceleration
- Sensor Management Network

Cultural Context

CEO — VP HR, VP Finance, VP Marketing, VP Engineering, VP Operations — Product A, Product B, Product C

Continuing the Industrial DevOps journey

- Industrial DevOps expands the definition of DevOps outside of software to enable significant cyber-physical systems development programs to be more responsive to changing needs while reducing lead times.

- It is the application of continuous delivery and DevOps principles to the development, manufacturing, deployment, and serviceability of significant cyber-physical systems.
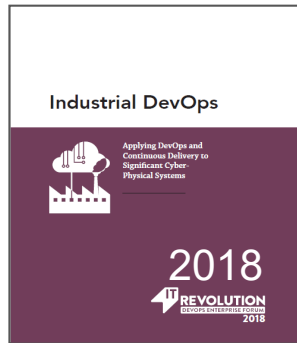
Defining the Principles

Applying the Principles

Applied Industrial DevOps 2.0 Coming soon...

- Value Streams
- Systems Architecture
- **Cultural Architecture**

https://itrevolution.com/book/industrial-devops/
https://itrevolution.com/book/applied-industrial-devops/

Scenario: Alset Transport

Business Goal: improve the collision-avoidance capability by increasing the obstacle-detection system's actionable closing distance by 50% of the current operating distance
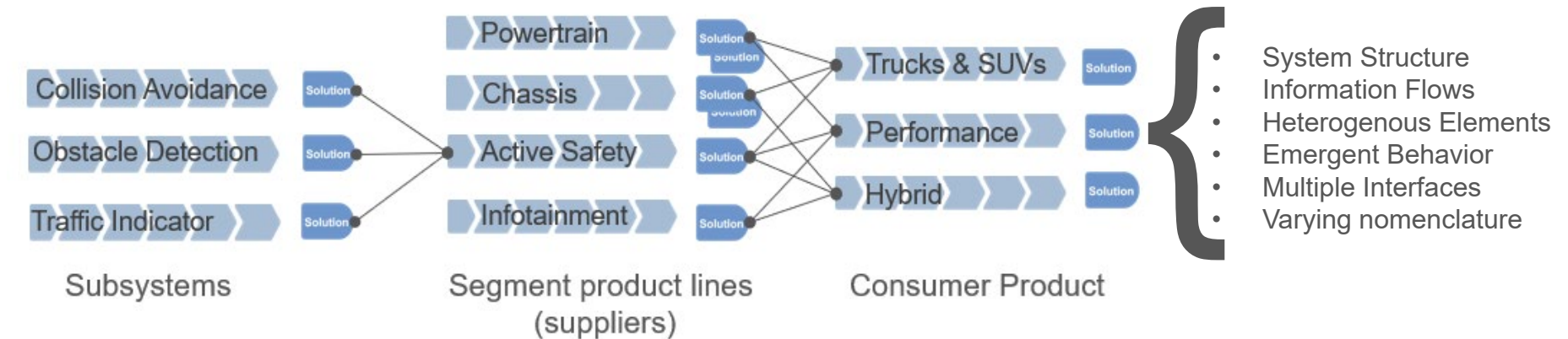
Apply Principle 1: *"Visualize and Organize Around the Value Stream"*

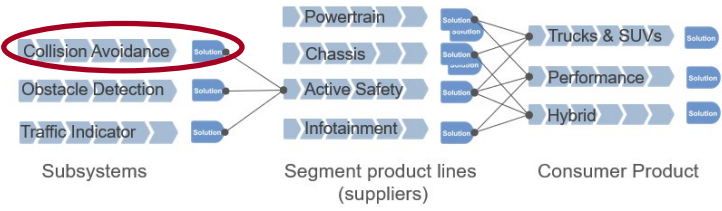| Epic	System Impact	Cultural Impact
Enhance obstacle-detection software or firmware in existing vehicles	Software	Multiple Suppliers and multiple teams within Active Safety Product line (Information Flow, Language, relationships)
Update camera and associated technology in future vehicles	Software, Firmware, Hardware	In addition to above, we have heterogenous subcultures and varied mental models

Alset Value Stream Identification (System Context)

Customer need/request   Delivered

Alset's Autonomous vehicle has several *"value streamlets"* to consider

Subsystems

Segment product lines (suppliers)

Consumer Product

Powertrain
Chassis
Active Safety
Infotainment

Collision Avoidance
Obstacle Detection
Traffic Indicator

Trucks & SUVs
Performance
Hybrid

- System Structure
- Information Flows
- Heterogenous Elements
- Emergent Behavior
- Multiple Interfaces
- Varying nomenclature

Alset Value Stream Identification (Cultural Context)

Customer need/request

Delivered

Collision Avoidance
Obstacle Detection
Traffic Indicator

Subsystems

Powertrain
Chassis
Active Safety
Infotainment

Segment product lines (suppliers)

Trucks & SUVs
Performance
Hybrid

Consumer Product

Alset's Autonomous vehicle has several *"teams"* to consider

- Organization Structure
- Information Flows
- Heterogenous Subcultures
- Mental Models
- Multiple relationships
- Varying language

Software

Development — System — Staging — Production

Continuous Integration

Virtual world

Hardware

Design — Synthesis — Verification

Physical world — Operational world

Manufacturing/ Assembly — Installation/ Operation

Continuou-ish Integration

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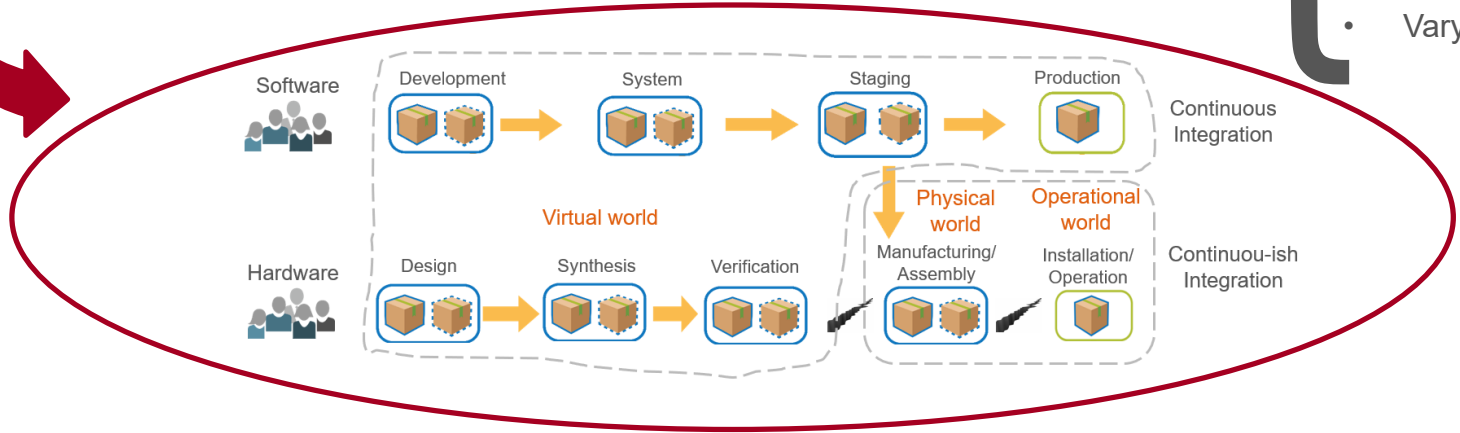
Architect the Product (System Context)

As Alset transitioned to apply Industrial DevOps across the *system*, it came to understand that many of the barriers to implementation stemmed from Alset's *legacy system structure*.

1. **System Validation**
   (System, Subsystem, Component)
2. **Active Prototyping**
3. **Refactor w/ Strangler Pattern**
4. **Innovate**

Alset's System Behavior Roadmap Owner: Lean-Agile Leader	Q1	Q2
System	Validate "AS IS" state at all system levels against business objectives	Design steel thread to move system to next desired state.
Prototype	Define Prototypes to prove out multiple hypothesis	Leverage Set based design to reduce solution alternatives
Refactor	Use System Telemetry from pipelines to show where improvements are needed	Refactor areas of solution that need to be optimized or simplified.
Innovate	Develop Personas of key customers to understand what future needs they have.	Implement solution day pitches or challenges to continuously evolve.

Architect the Culture (Cultural Context)

As Alset transitioned to apply Industrial DevOps across the ***organization***, it came to understand that many of the barriers to implementation stemmed from ***Alset's organizational culture***.

1. Mind-set Validation
2. Org Surrounding Support Structure
3. Technical Competency
4. Active Role-modeling

Alset Organizational Behavior Roadmap
Owner: Lean-Agile Leaders

	Q1	Q2
Mind-sets	Provide relevant external case-studies that drive the point to change	Develop and publish Internal case-studies to share internally (localized outcomes/success)
Structures	Permission to fail (ie provide awards for failure)	Team-based performance awards
Competency	Role based learning– acknowledge the gaps and build learning plans	Brown-bag lunch & learns
Role-modeling	Leadership commits and uses Lean-Agile language	Leadership participates in an Lean-Agile book club

Help We Are Looking For

▸ Other examples of value streams for large cyber-physical solutions

▸ How has your organization addressed leadership and cultural challenges for large transformations?

▸ Information or stories on bridging the gap between manufacturing and development across different phases of the product life cycle

Contributors

2019

- Josh Atwell jatwell@splunk.com

- Ben Grinnell ben.grinnell@northhighland.com

- Dean Leffingwell, Co-founder and Chief Methodologist, Scaled Agile Inc.

- Dr. Suzette Johnson, Fellow and Agile Transformation Lead, Northrop Grumman Corporation

- Harry Koehnemann, SAFe Fellow and Principal Consultant, Scaled Agile Inc.

- Vincent Lussenburg vlussenburg@xebialabs.com

- Dr. Steve Mayner, SAFe Fellow and Principal Consultant, Scaled Agile Inc.

- Robin Yeman, Lockheed Martin Fellow, Lockheed Martin Corporation

2020

- Joy Crook, Organization Effectiveness Consultant, Northrop Grumman Corporation

- Dr. Suzette Johnson, Fellow and Agile Transformation Lead, Northrop Grumman Corporation @drsuz_johnson

- Harry Koehnemann, SAFe Fellow and Principal Contributor, Scaled Agile Inc.

- Jeffrey Shupack, President, Project & Team

- Dr. Steve Spear, Principal HVE LLC, Sr. Lecturer MIT, Author The High Velocity Edge

- Hasan Yasar, Technical Director, Adjunct Faculty Member, Software Engineering Institute, Carnegie Mellon University

- Robin Yeman, Lockheed Martin Fellow, Lockheed Martin Corporation, @robinyeman

Reviewers
- Dr. Jeff Boleng
Special Assistant for Software Acquisition to the Undersecretary of Defense for Acquisition and Sustainment, Software Engineering Institute

- Eileen Wrubel
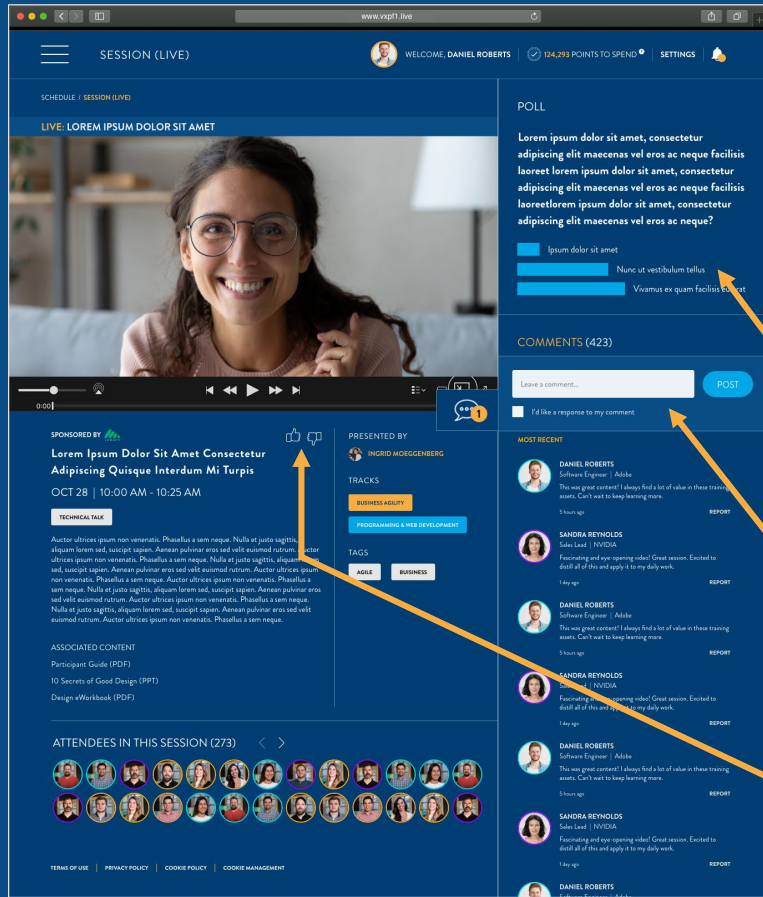Co-Lead of the SEI's, Agile/DevOps Transformation, Software Engineering Institute

Summary

Leveraging the power of Industrial DevOps for large complex systems is an industry step change and the companies that solution this problem first will increase transparency, reduce cycle time, increase value for money, and innovate faster.

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2 Comment

3 Thumbs up or down

Thank you!