Women in Tech – MATLAB Expo, UK

Journey in Engineering

Digital Transformation and Model-Driven Engineering in Real Applications
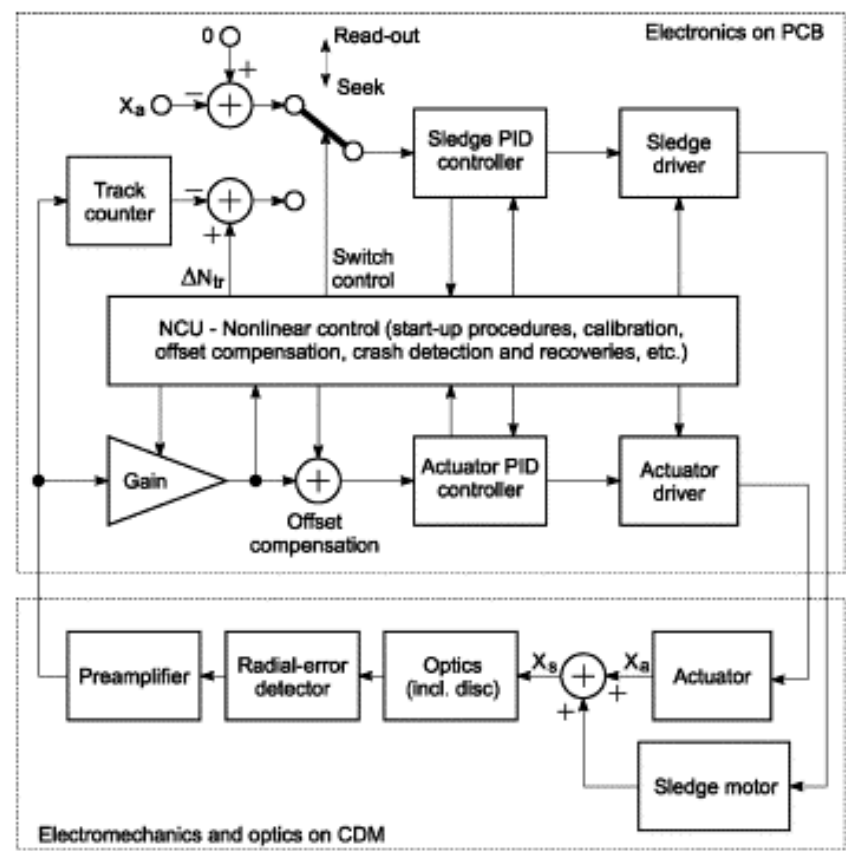
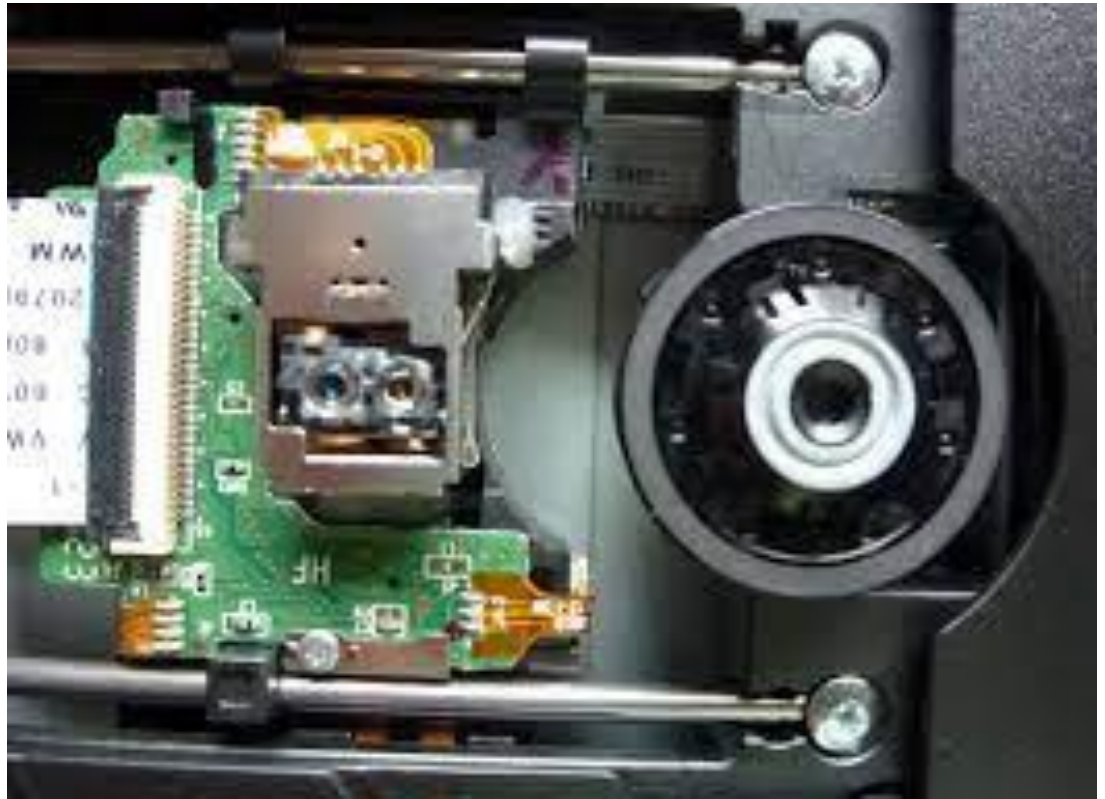Name of Speaker: Deepaa Ganesh
Date: 05-10-2023

About my self

- Deepaa Yoharany Ganesh BEng(Hons), MSc, MIET, MINCOSE

- Joined QinetiQ March 2020 - Technical lead and a Systems Engineering Manager

- Previously, worked at
  - Thomson Multimedia (Thales) (UK, Singapore)
  - Philips Optical Storage (Singapore, Netherlands, Belgium, Hong Kong)
  - Philips Semiconductors, NXP Semiconductors, Wolfson Microelectronics (UK)
  - Jaguar Land Rover (UK)

- 30 plus years of experience
  - Embedded System Design
  - System Design and Product Development
  - Advanced Precision Servo control design

- Used Matlab/Simulink from University, I was a Matlab Guru in Philips and other Organisations; Used Mathworks products for Real-Time system implementation and integration, Rapid Prototyping, Algorithm Development, Innovations, demonstrations.

- This includes: Research and Product Development; Technology Selection for new products; System Engineering; System on Chip Design; Advanced Control and Signal Processing; Model Based Design (Algorithm to FPGA); System Integration; Sensor and Data Fusion, Autonomous Systems; Advanced Driver Assistance Systems (ADAS; Technical Management and Delivery

- Member of INCOSE and Member of IET.

- Hold multiple Patents (Collision avoidance, Digital Filtering, ADAS, Digital Servo Design)
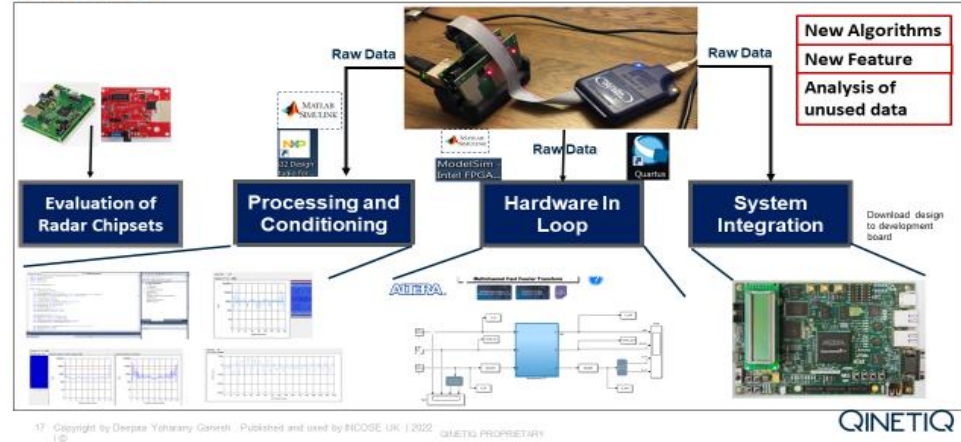
Singapore

VAM2201

Electronics on PCB

- Read-out
- Seek
- Sledge PID controller
- Sledge driver
- Track counter
- ΔN_{tr}
- Switch control
- NCU - Nonlinear control (start-up procedures, calibration, offset compensation, crash detection and recoveries, etc.)
- Gain
- Offset compensation
- Actuator PID controller
- Actuator driver

Electromechanics and optics on CDM

- Preamplifier
- Radial-error detector
- Optics (incl. disc)
- X_s
- X_a
- Actuator
- Sledge motor

Transparent Trailer

Night Vision Systems

Terrain Identification & Sensor Fusion

Terrain Information Center and Coach

Recipe for Product Development Success

Visibility

Predictability

Flexibility

Traceability

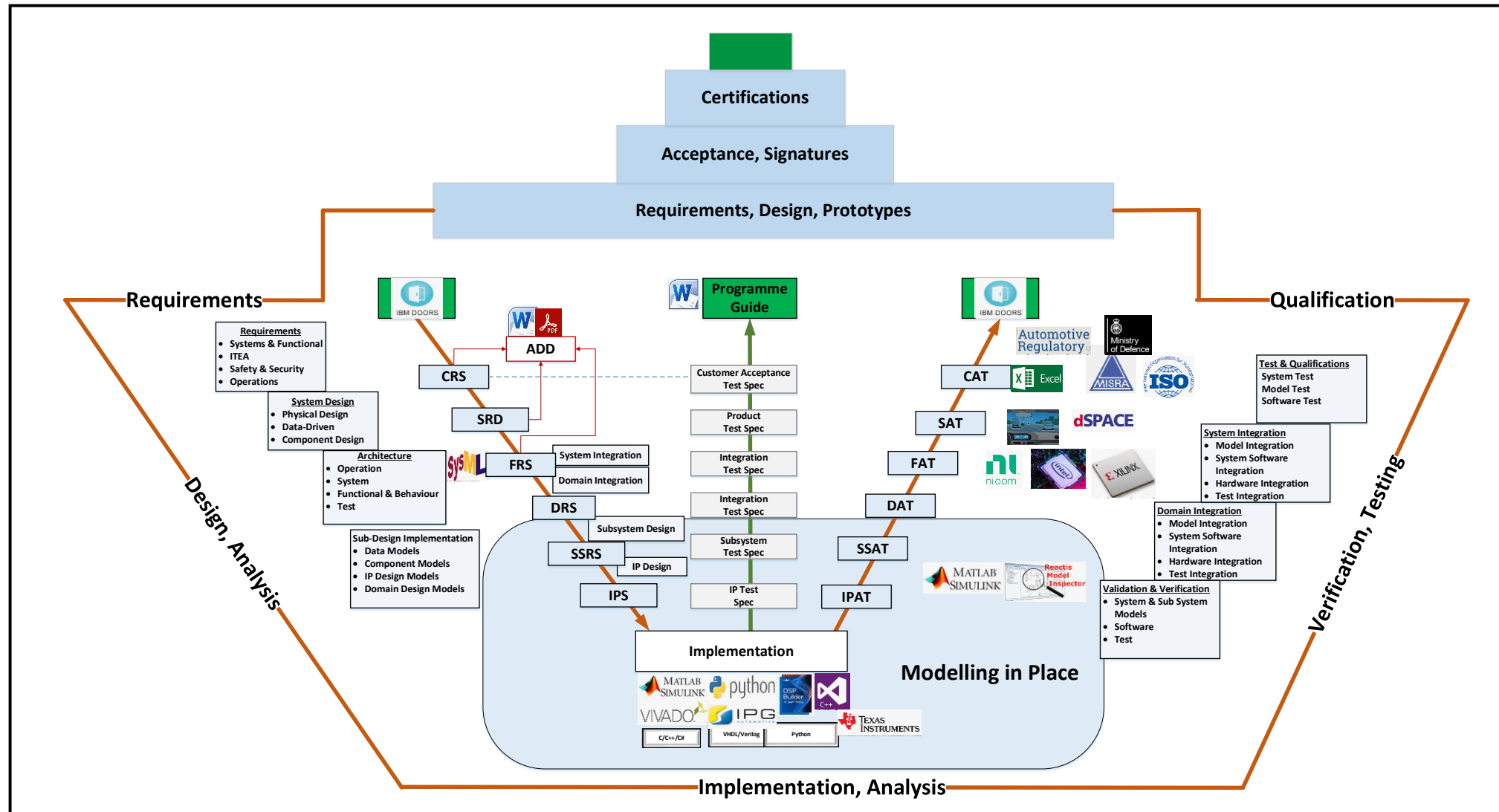**Sustainability**

Agility

+

Decision Making

QINETIQ
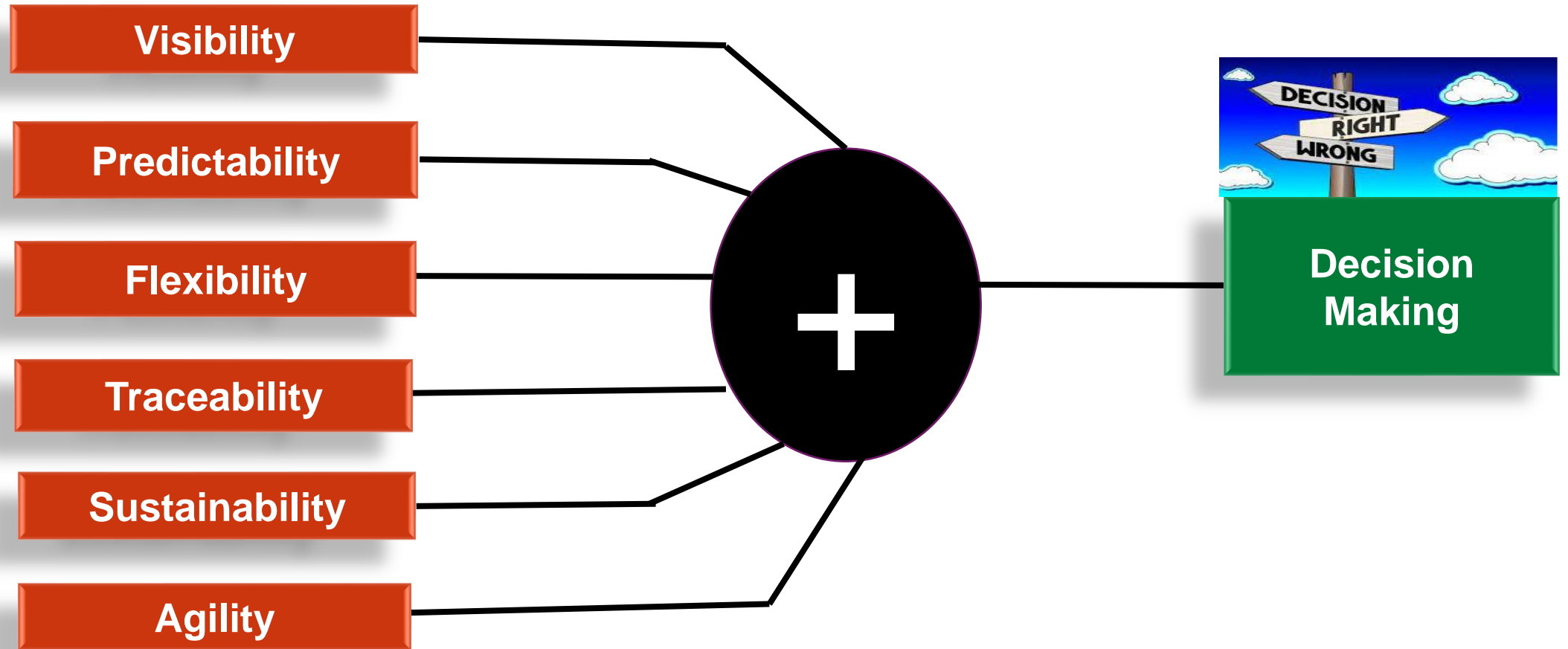
Meaning of words – The M * Acronyms Map

Model-Based Systems Engineering (MBSE)
Model-Based Architecture (MBA)
Model-Based Design (MBD)
Model-Driven Development (MDD)

Model-Driven Engineering (MDE)

MBSE | MBA | MBD | MDD

Modelling and Simulation

Plan

Process

Predict
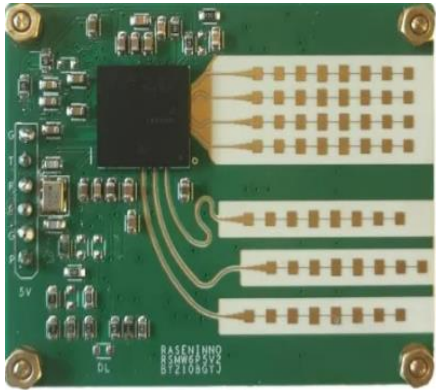
Prototype

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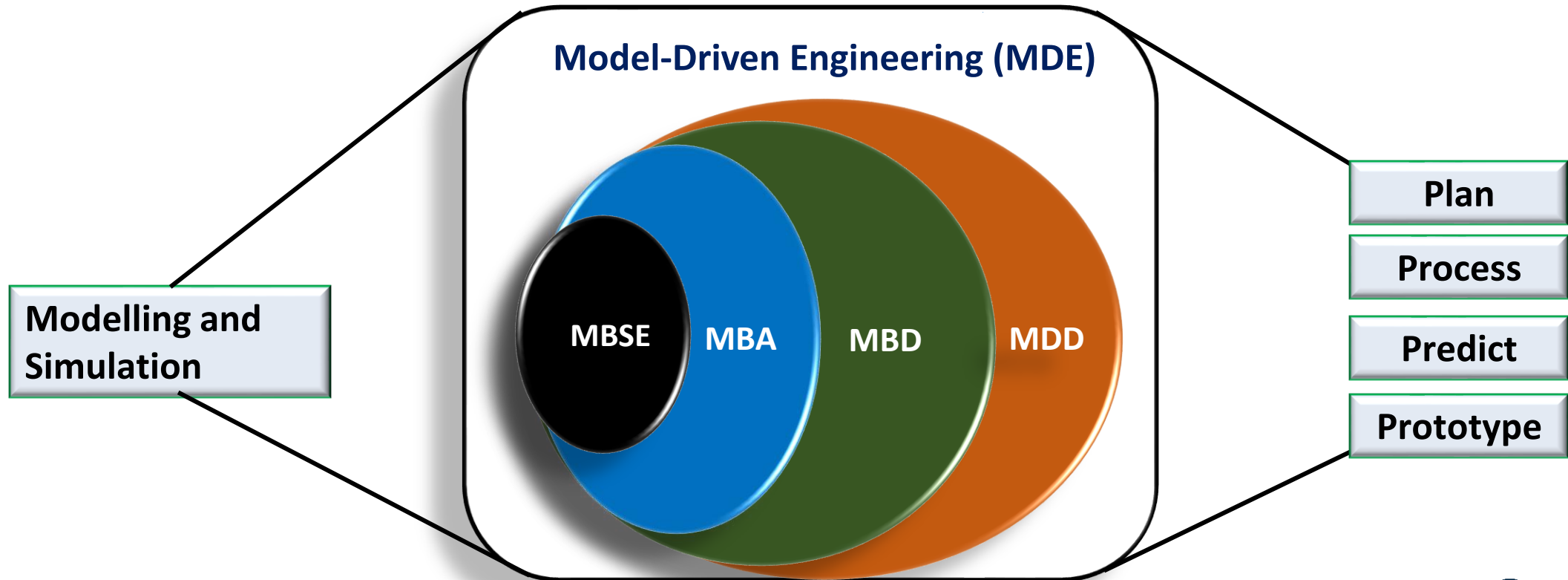
Systems Engineering V-Model

Model-Driven Engineering Supports …

Functional Development	**Testing embedded Systems**	**Verification Networks**
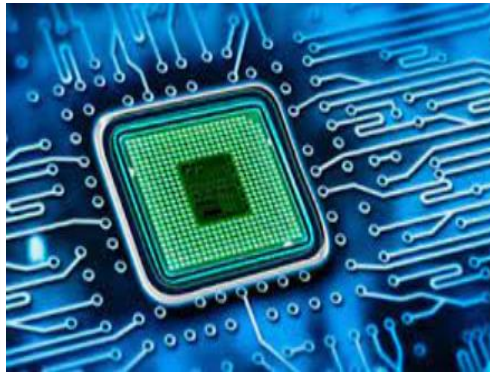
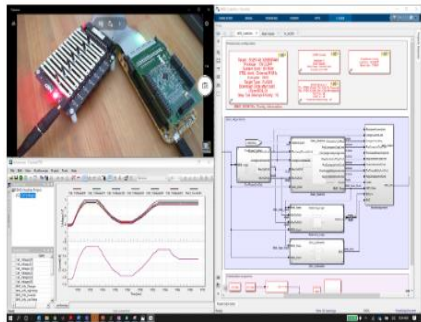| **Hardware-In-Loop Testing**	**Software-In-Loop Testing**	**Processor-In-Loop Testing**

And allows you to …

- ✓ Analyse Real-time System
- ✓ Implement Real-time System Solutions
- ✓ Integrate the system in Real-Time
- ✓ Optimise Solution through analysis and simulation
- ✓ Develop Production code

Common Tools for Model Driven Engineering

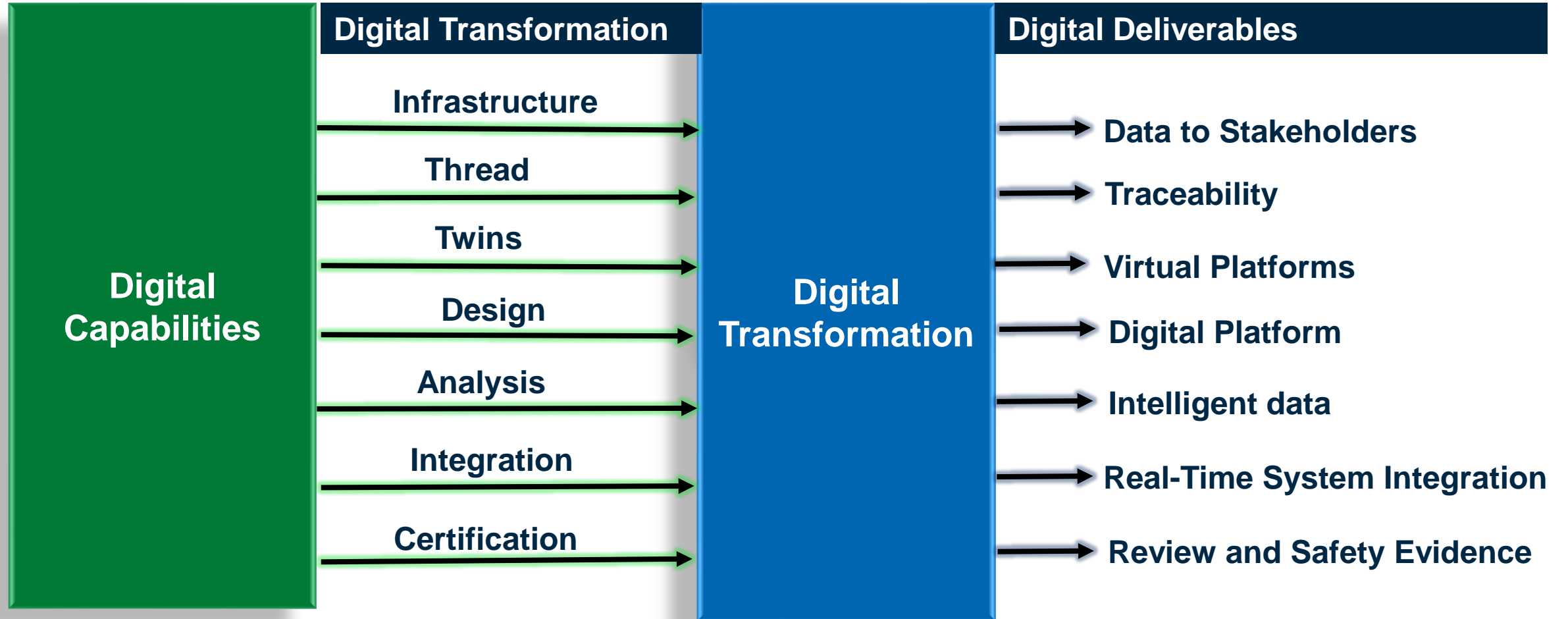| Activity	Tools
Requirement Management	IBM DOORS, Polarion , Genesys
Architecture	EA Architecture (SysML , UML) , System Composer, Genesys
Design	Mathworks, Microsoft visual studio, DSP Builder, Vivado, CR-8000, E3.Series
Implementation	Mathworks, DSP Builder, Vivado, Microsoft visual studio, CR-8000, E3.Series
Test and Verification	Mathworks, Reactis Tool, CR-8000, E3.Series

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Future Vision (How we can achieve it)

Digital Capabilities

Digital Transformation
- Infrastructure
- Thread
- Twins
- Design
- Analysis
- Integration
- Certification

Digital Transformation

Digital Deliverables
- Data to Stakeholders
- Traceability
- Virtual Platforms
- Digital Platform
- Intelligent data
- Real-Time System Integration
- Review and Safety Evidence

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In the ever-evolving landscape of markets and business, our future vision is a journey of continual adaptation and innovations.

Embrace these transformations, harness technological advances

and keep rocking in this dynamic era of opportunity.

Kathryn Minshew(opens in a new tab), Co-Founder and CEO(opens in a new tab) of The Muse(opens in a new tab):
"An ugly baby is better than no baby at all. If you wait and wait and wait for your product to be perfect before you release it out into the world, you will often never get there. I am a big supporter of the minimum viable product and taking something that is the simplest explanation of your idea and putting it into the marketplace so you can start to get feedback."

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