

# RL78/F24

## Motor Control IP BlockSet

(UNDER DEVELOPMENT)

07/2023

HIGH PERFORMANCE COMPUTING, ANALOG AND  
POWER SOLUTIONS GROUP

REV. 1.0

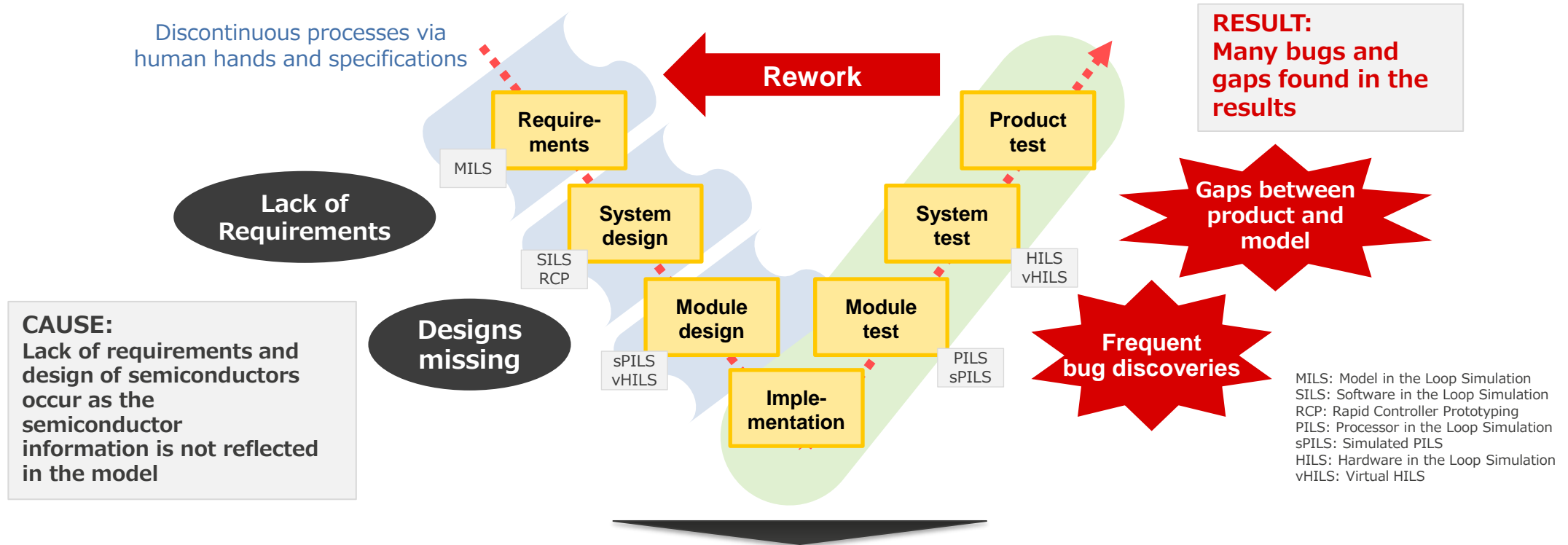
RENESAS ELECTRONICS

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# ISSUES REGARDING V-MODEL FOR MANUFACTURING

On the left side of the V-model, information on semiconductor assets are not used. Therefore, frequent bugs and gaps will be discovered on the right side of the V-model



Apply information on semiconductor(\*) to the left side of the V-model and solve issues

\*) Function and performance of IP, Software execution time.

# RENESAS MODEL BASED DEVELOPMENT SOLUTION

Design process utilizing MBD methodology is getting attention to improve efficiency.

Renesas MBD Solution

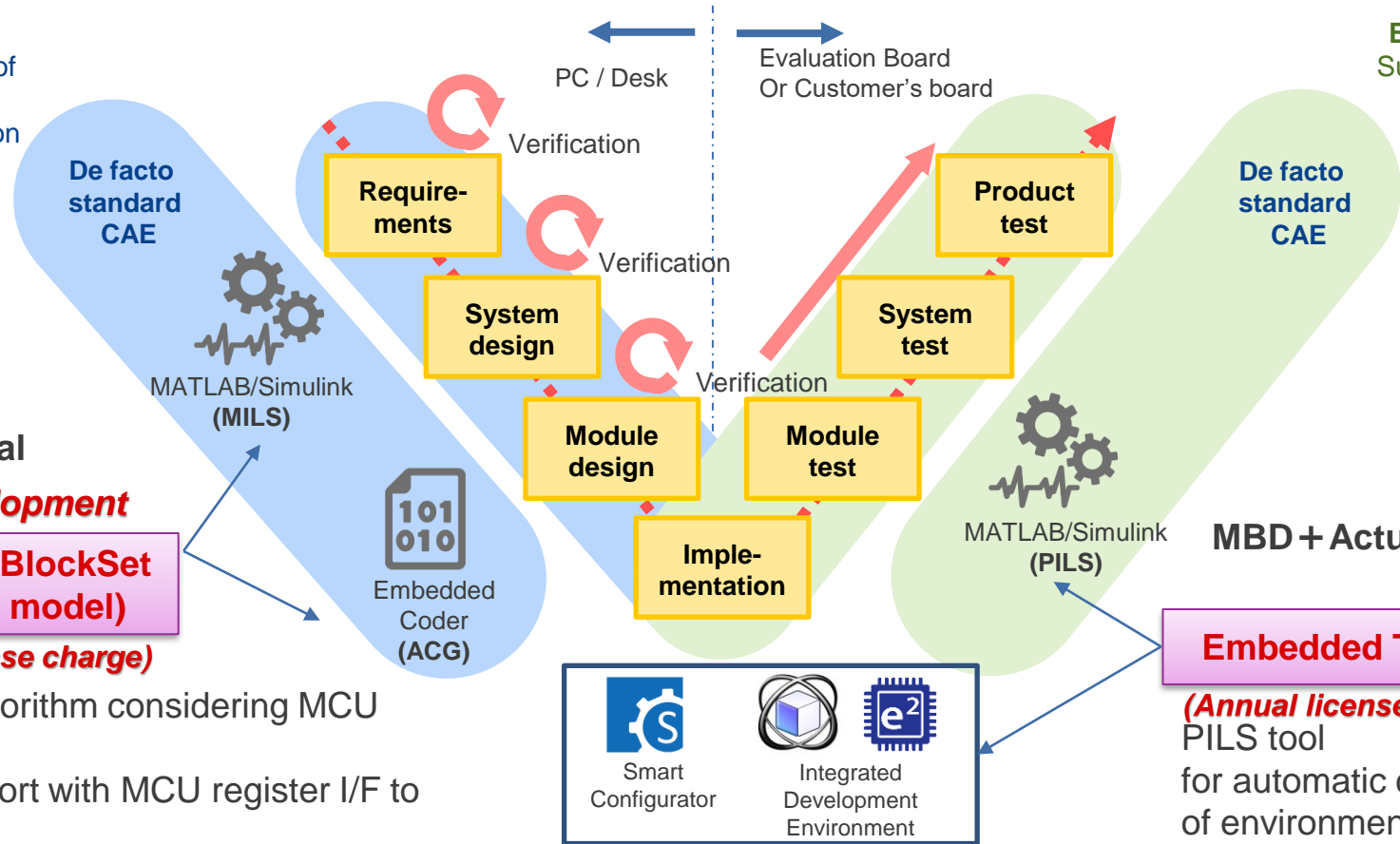
**IP BlockSet:**  
Implementation of Genuine MCU peripheral function

**Embedded Target:**  
Support verification of CPU performance/real world

**MBD New proposal**  
*Under Development*  
**Renesas IP BlockSet (Hardware model)**  
*(Annual license charge)*

**MBD + Actual MCU**  
**Embedded Target**  
*(Annual license charge)*

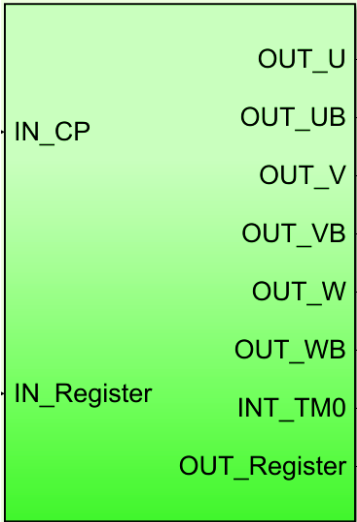
- Developing control algorithm considering MCU behavior
- Generating code support with MCU register I/F to build the program



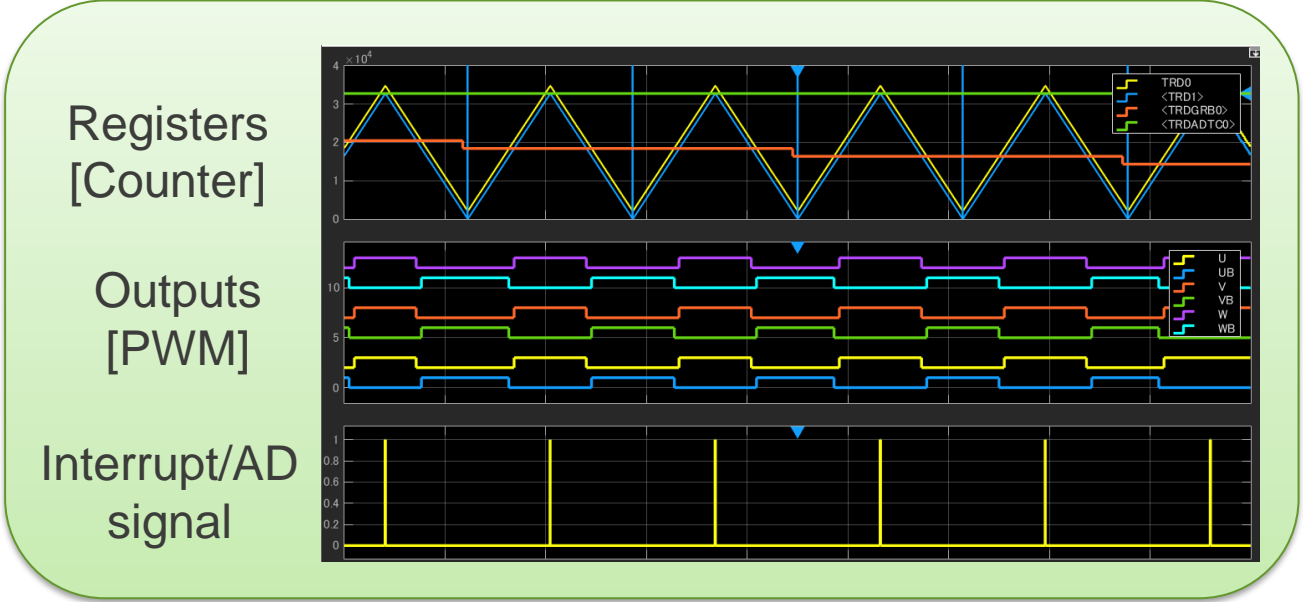
# MODEL BASED DEVELOPMENT SOLUTION USING THE ACCURATE SEMICONDUCTOR MODEL

# CONCEPT OF RL78/F24 IP BlockSet

Offer the Simulink® model with the same functional behavior of target MCU



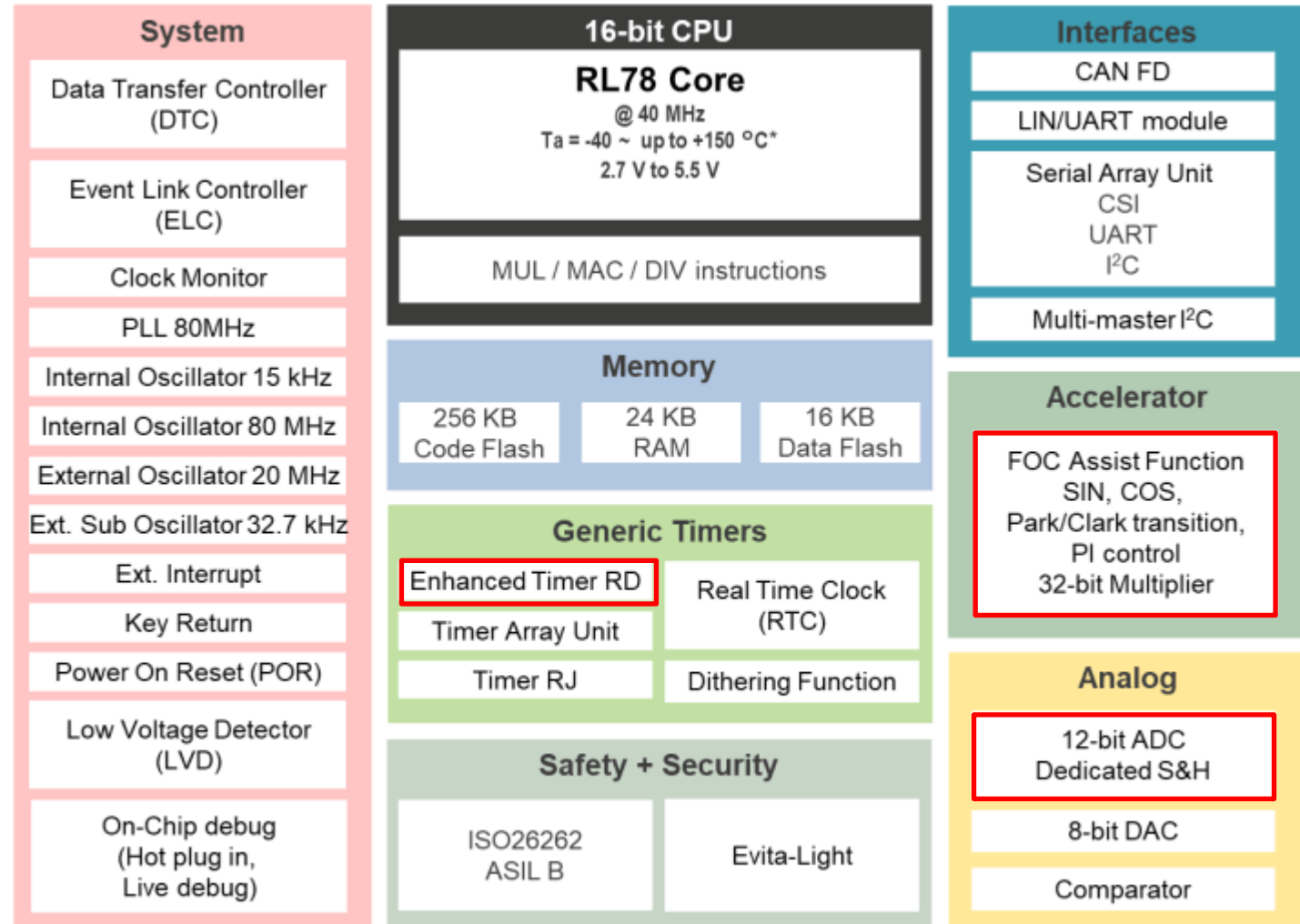
IP BlockSet  
(Simulink® Model)



**Achieve accurate function and behavior**

# RL78/F24 IP BlockSet

- Fundamental motor/inverter control IPs
  - Timers
    - Timer RDe (TRD)
  - Analog
    - 12-BIT A/D CONVERTER (AD)
  - Accelerator
    - APPLICATION ACCELERATOR UNIT (AAU)

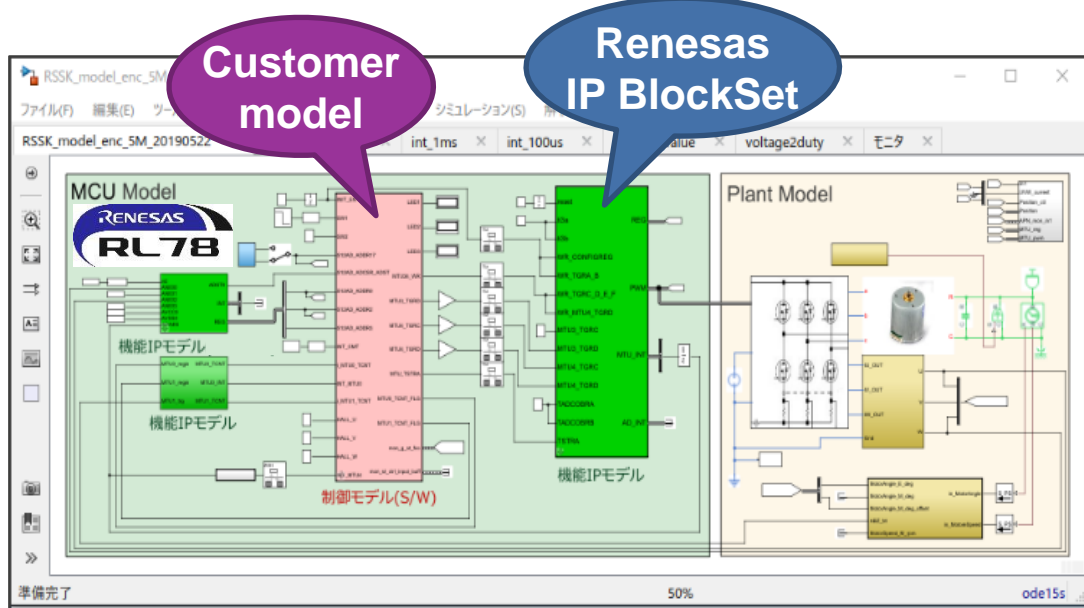


# RL78/F24 IP BlockSet FEATURE : IMPROVING CONTROL MODEL DESIGN EFFICIENCY USING IP BlockSet FOR MILS

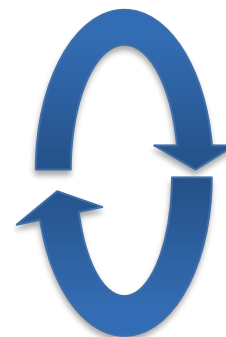
Enable to handle design iteration in model world with applicable MCU behavior

- Build a virtual system quickly by connecting with the user model.
- Examine and confirm the operation assuming an actual MCU behavior on the model.

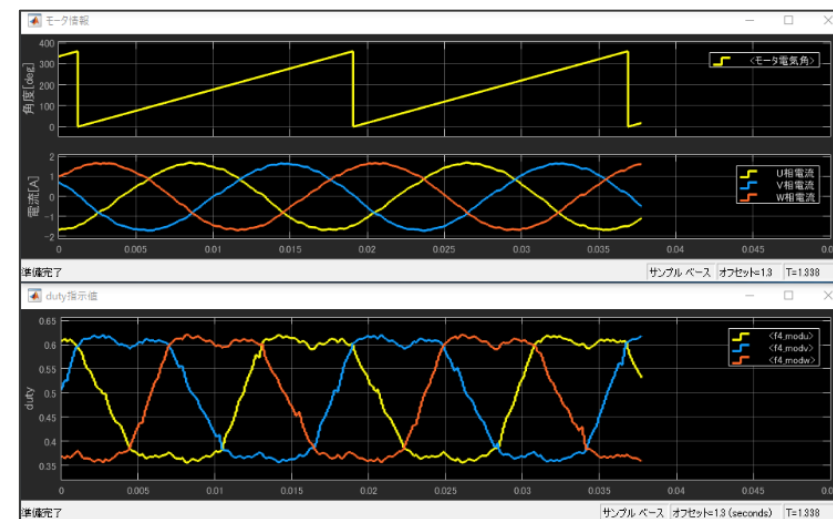
MATLAB/Simulink



Controller model design



Simulation w/o device



# DEVELOPMENT ENVIRONMENT

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## OS

Windows platform

**Operation Environment**  
**MathWorks tool version**  
**R2018b**

### ● Model Development Environment

MATLAB®

Simulink®

### ● Simulation Execution Environment (Sample Model\*)

Simscape™

\*Required for motor control sample model. Not required for IP BlockSet.



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[Renesas.com](https://www.renesas.com)