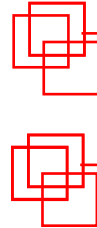


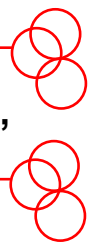
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« e-subsystem HiL testing using EMR for a P-HEV »

**Florian TOURNEZ¹, Walter LHOMME¹, Alain BOUSCAYROL¹, Betty LEMAIRE-SEMAIL¹
Robin VINCENT², Sylvain ROCQUET², Aurélien LIEVRE², Mariam AHMED²**

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² Valeo, Créteil, France



- 1 Studied P-HEV vehicle**
- 2 EMR & control**
- 3 Reduced-scale power HiL testing**

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« Studied P-HEV »

e-subsystem HiL testing using EMR for a P-HEV

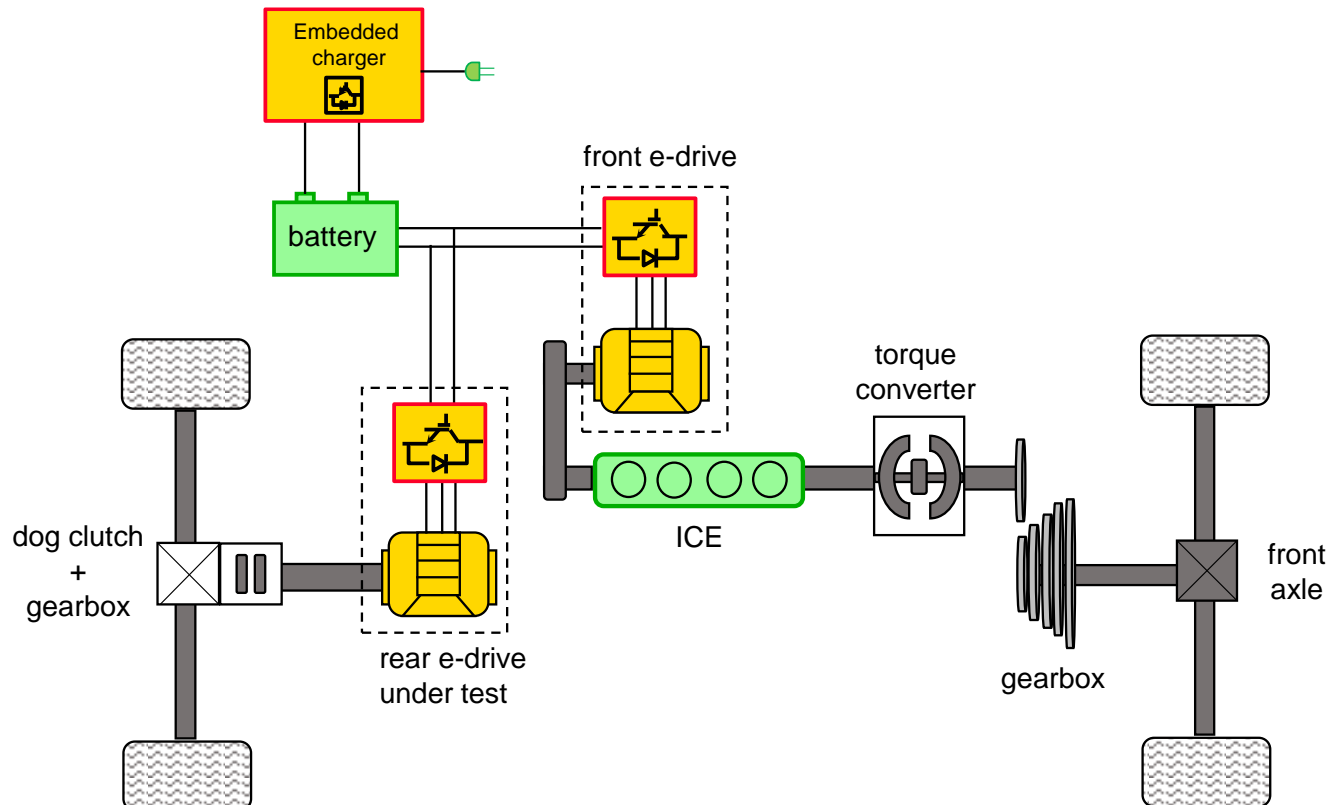
- Studied P-HEV vehicle: Peugeot 308 SW retrofitted -

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4

Characteristics:

- Low voltage hybridization of 48V
- P0 front electrical machine (4kW)
- P4 rear electrical machine (25kW, bi-ratio)
- Battery pack of 5kWh



e-subsystem HiL testing using EMR for a P-HEV

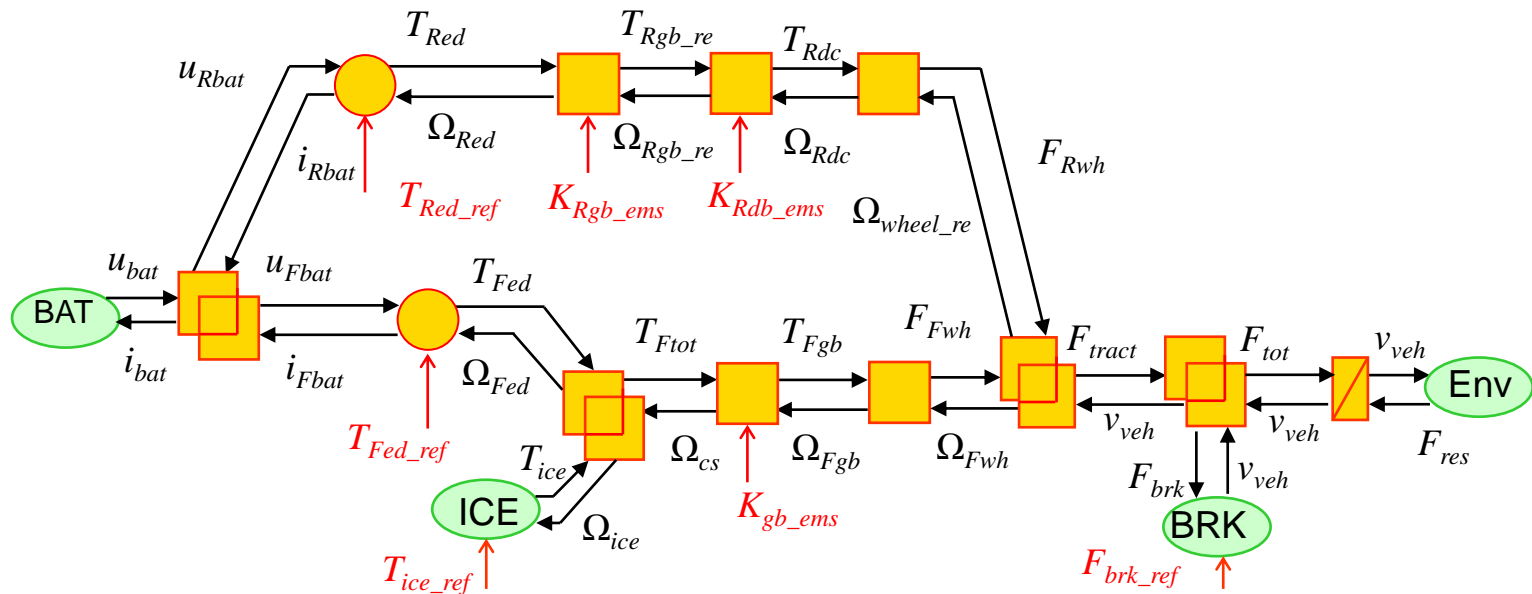
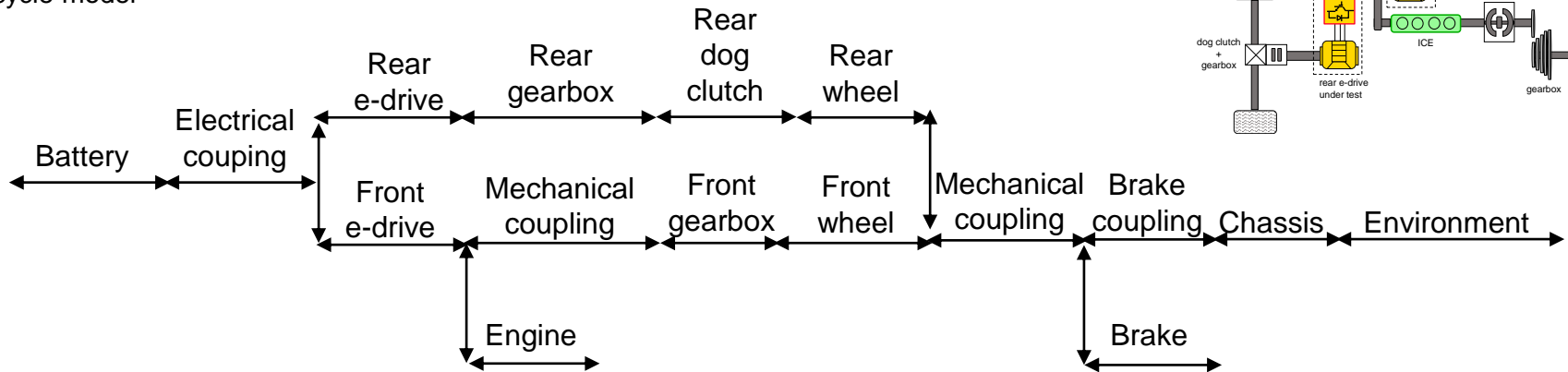
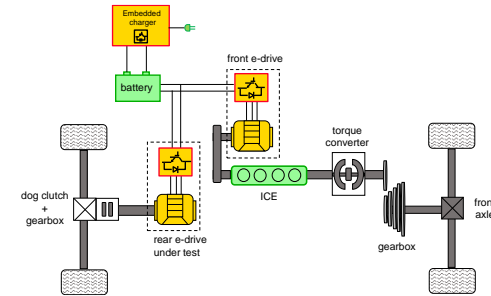
- EMR -

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Assumptions modelling:

- Inertia of shaft neglected
- Front and rear gearbox/clutch simplified
- Bicycle model



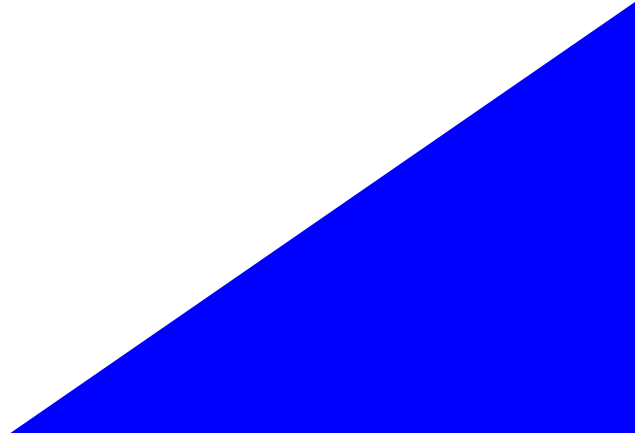


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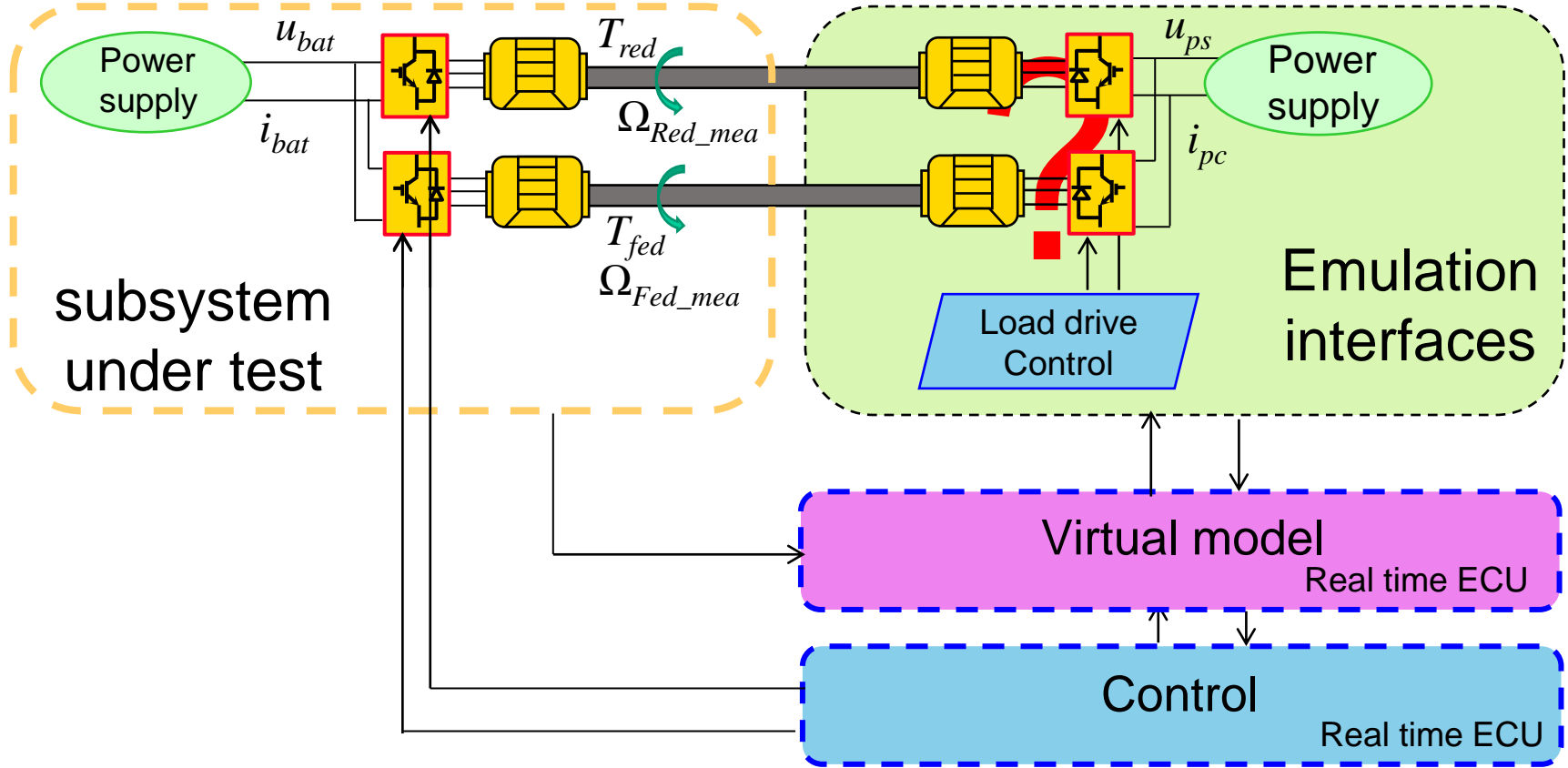
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**« e-subsystem reduced-scale power
HiL testing »**



- Power HiL testing principle -

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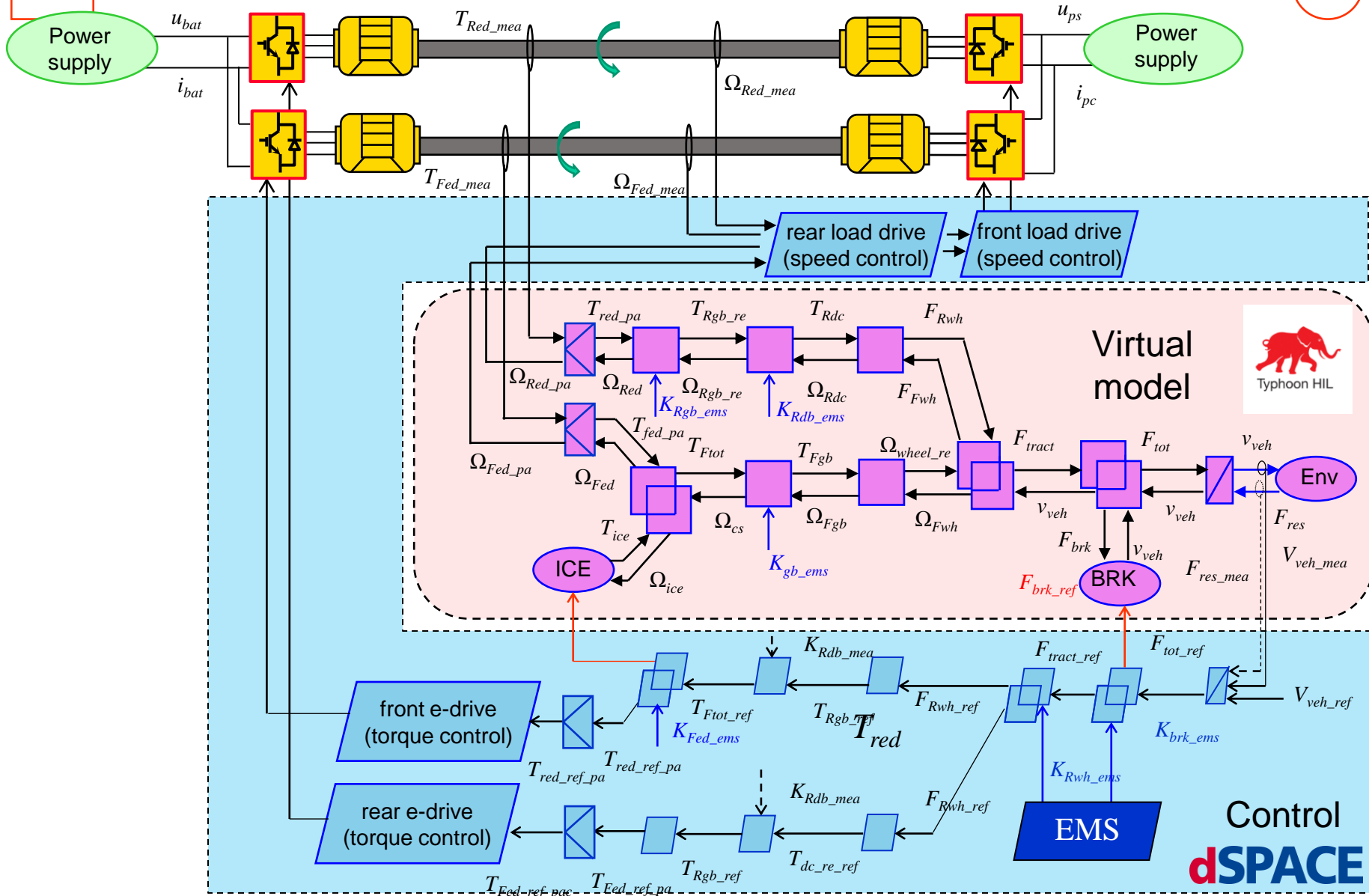


Objective: reduced-scale power HiL testing

- Validate the control and its power management strategy in real time in a first step
- Detecting problems upstream before the full scale power HiL

e-subsystem HiL testing using EMR for a P-HEV

- Reduced-scale Power HiL testing -



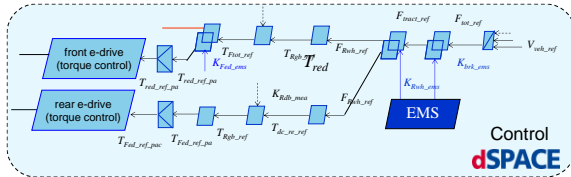
e-subsystem HiL testing using EMR for a P-HEV

- Reduced-scale power HiL setup -

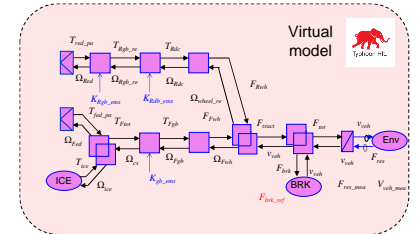
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10

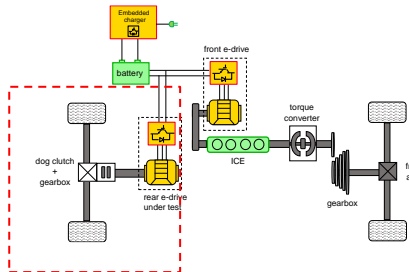
dSPACE 1005



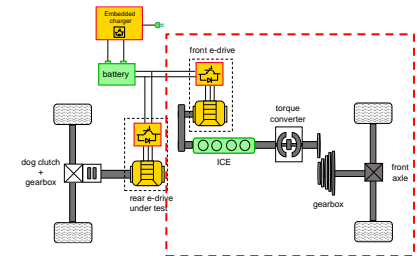
Typhoon HIL 604



bench representing the rear axle



bench representing the front axle

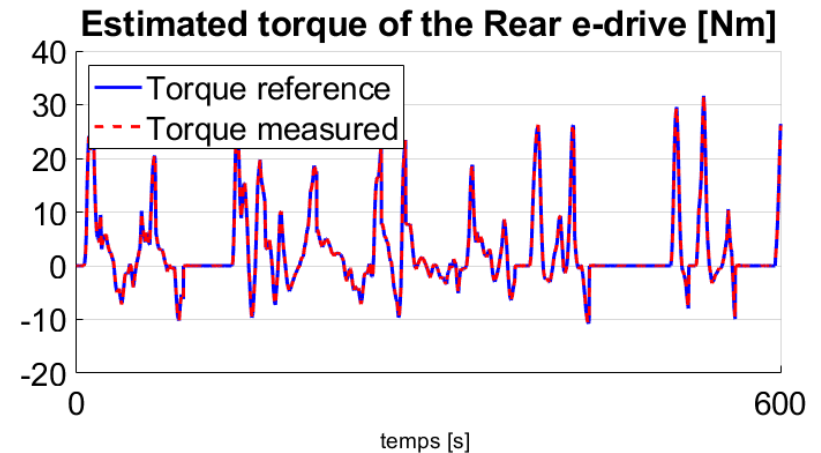
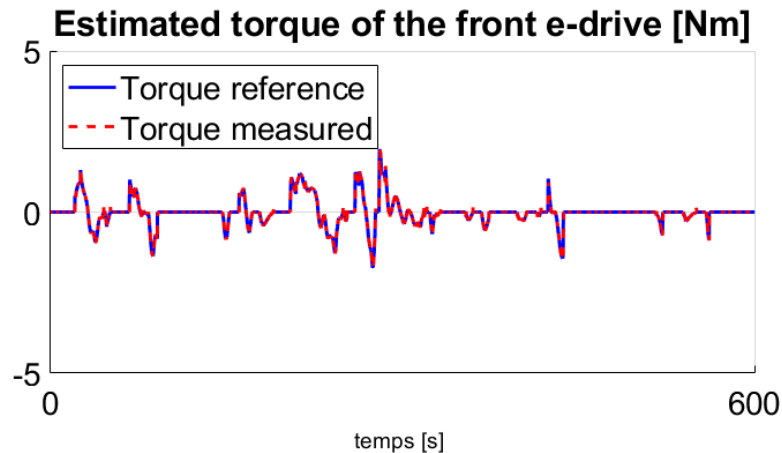
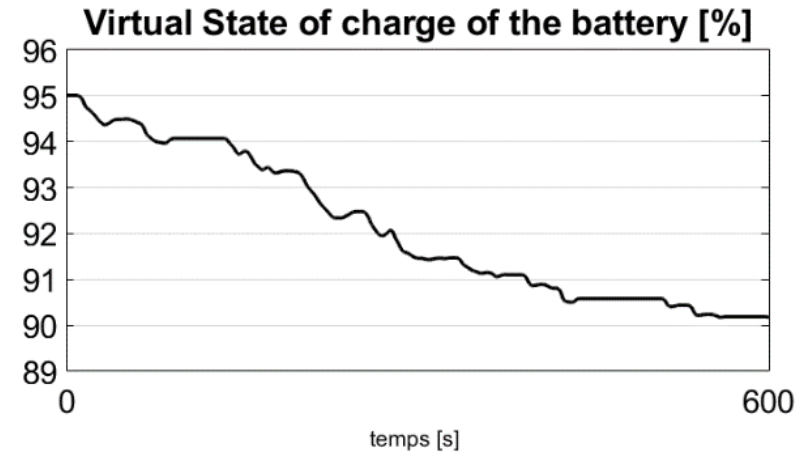
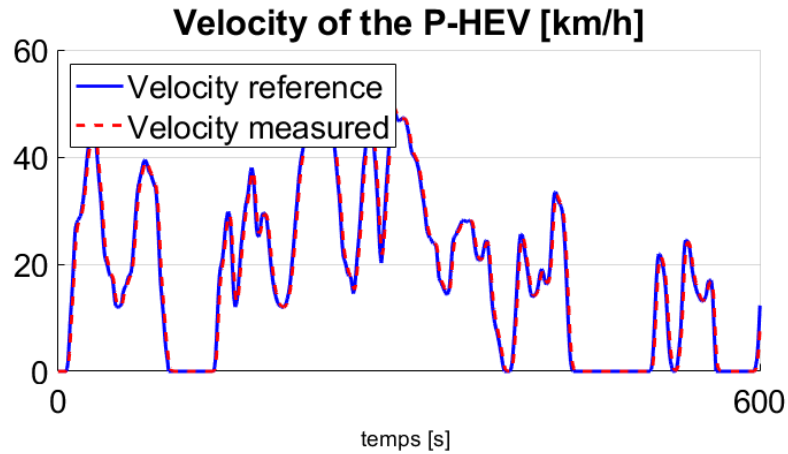


e-subsystem HiL testing using EMR for a P-HEV

- reduced-scale power HiL testing results -

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11



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« Conclusion »

Conclusion

- ❑ A Model, its control and a simple rules based strategy was developed
- ❑ First step: Reduced scale power HiL was validated
- ❑ Second step: Full scale power HiL was validated at Valeo Compagny

Perspective

- ❑ Move the virtual model inside a cloud to perform HiL tests with it



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e-subsystem HiL testing using EMR for a P-HEV

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15

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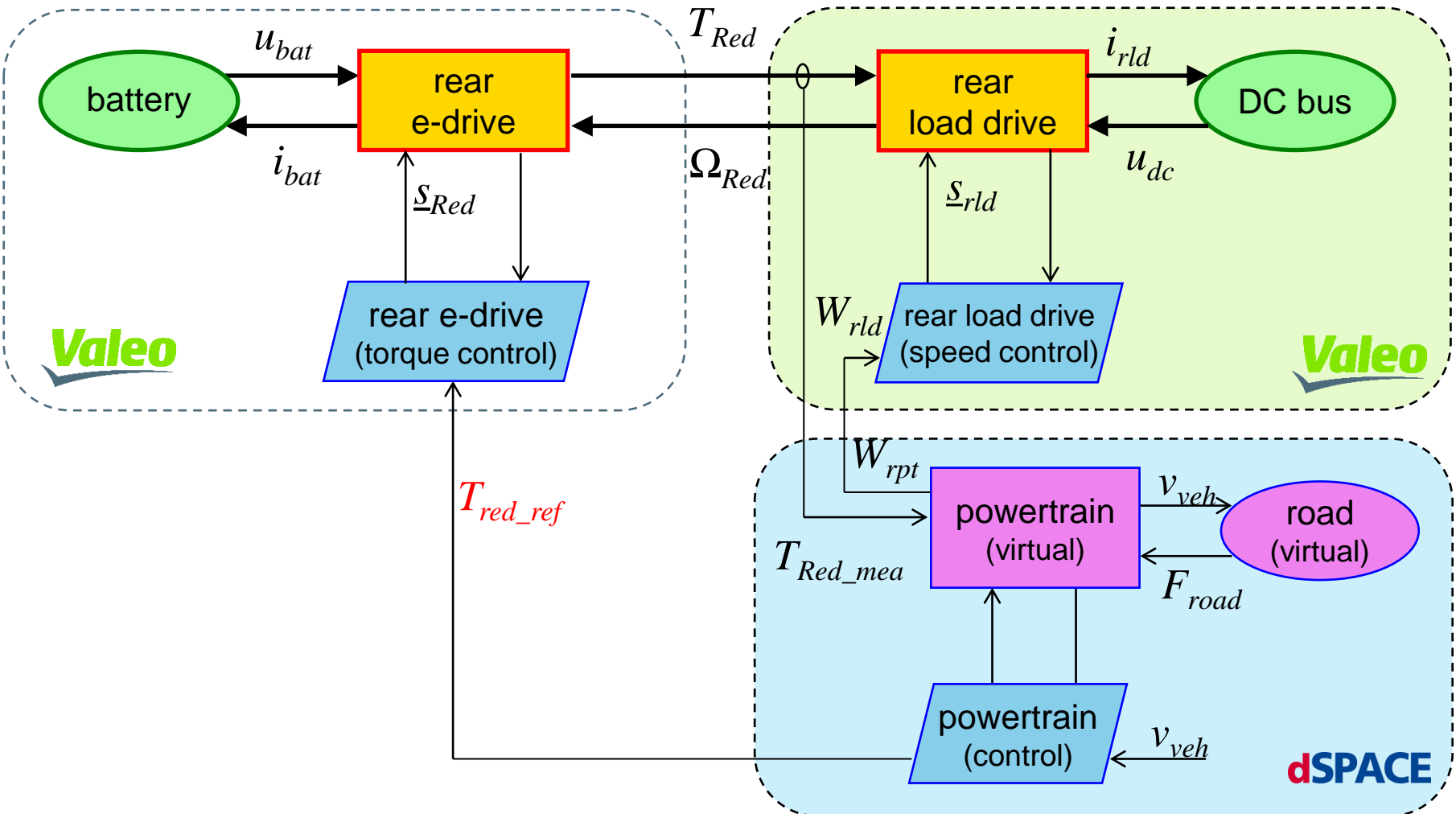
« **Annexe** »

e-subsystem HiL testing using EMR for a P-HEV

- Annexe n°1 -

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18



e-subsystem HiL testing using EMR for a P-HEV

- Annexe n°2 -

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19

