

FEV Signature Solutions

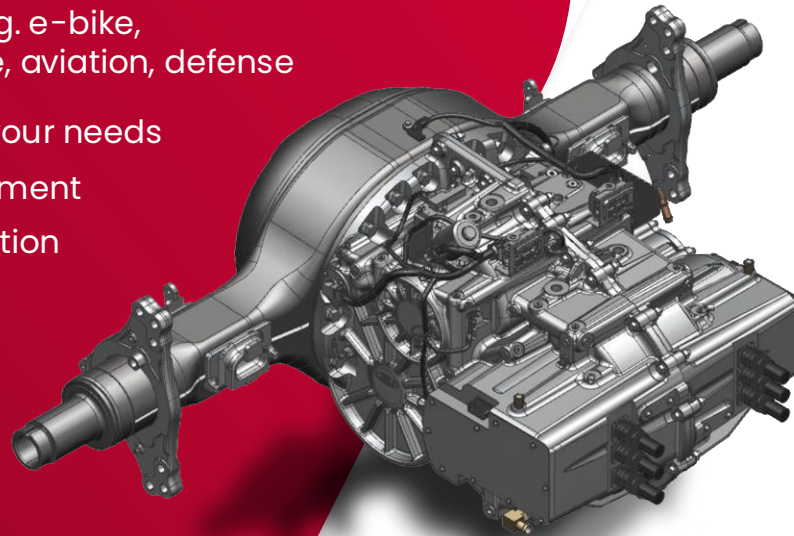
Electric drive unit and transmission control software



Our tailor made, proven and open solutions enable your success in electric drive unit and transmission control

FEV offers

- Electric drive unit and transmission software – from demonstrator up to series
- Tailored propulsion system solutions for e.g. e-bike, passenger car, heavy duty, mining, marine, aviation, defense
- Complete or partial service according to your needs
 - Customized customer process development
 - System engineering and concept definition
 - Software requirement development
 - Implementation and integration
 - Verification and validation
 - Commissioning and calibration



Why FEV

- Proven functions applied to various applications and continuously optimized
- Unique functionalities from FEV available for your own applications
- White box option to enable you to use FEV's solution as basis for your own development
- Customization by FEV to exactly address your needs
- Adaptation to the latest regulations and standards or your requirements, as A-SPICE and ISO26262
- Different license options, as one time license fee and tailored license scope

Selected reference projects

EDU AND TM SW DEVELOPMENT

Chinese OEM

EDU production software for different vehicle applications

Multi-speed electric drive unit for commercial vehicle

- Complete multi-speed EDU developed by FEV
- Patented dog clutch engagement function
- Torque control for power shifts with two e-machines
- Optimized e-machine torque control

American OEM

Modular automatic transmissions production software

One SW for all construction vehicle transmission applications

- Single SW from trucks with 14 forward and 2 reverse gears to wheel loaders with 5 forward and 4 reverse gears with completely different transmission HW with and without torque converter
- New shift control concepts with continuous slip control based on the driver requested acceleration

European OEM

EDU demonstrator software for e-bike

Multi-speed electric drive unit for e-bike

- Complete multi-speed EDU including electronics developed by FEV
- Pedal angle-dependent shifts for optimal shift quality and durability

Asian OEM

Adaptable predictive torque and gear shifting software

All heavy-duty vehicle applications

- State of the art predictive torque and gear shifting based on GPS data
- Global optimum torque plus gear and ECO-Roll combination to improve fuel economy



Patents

Method for controlling a dog clutch

VASUDEVAN, REMELHE
DE102023114996 (application)

Speed controller for low inertia ePTO

RAYMOND, REMELHE
DE102024122431 (application)

Predictive gear shifting strategy based on GPS slope and curvature information

JAKKAMPUDI, REMELHE
DE102024102437 (application)

Driver speed range prediction based on GPS road topography information

BATT, JAKKAMPUDI, REMELHE
DE102024120516 (application)

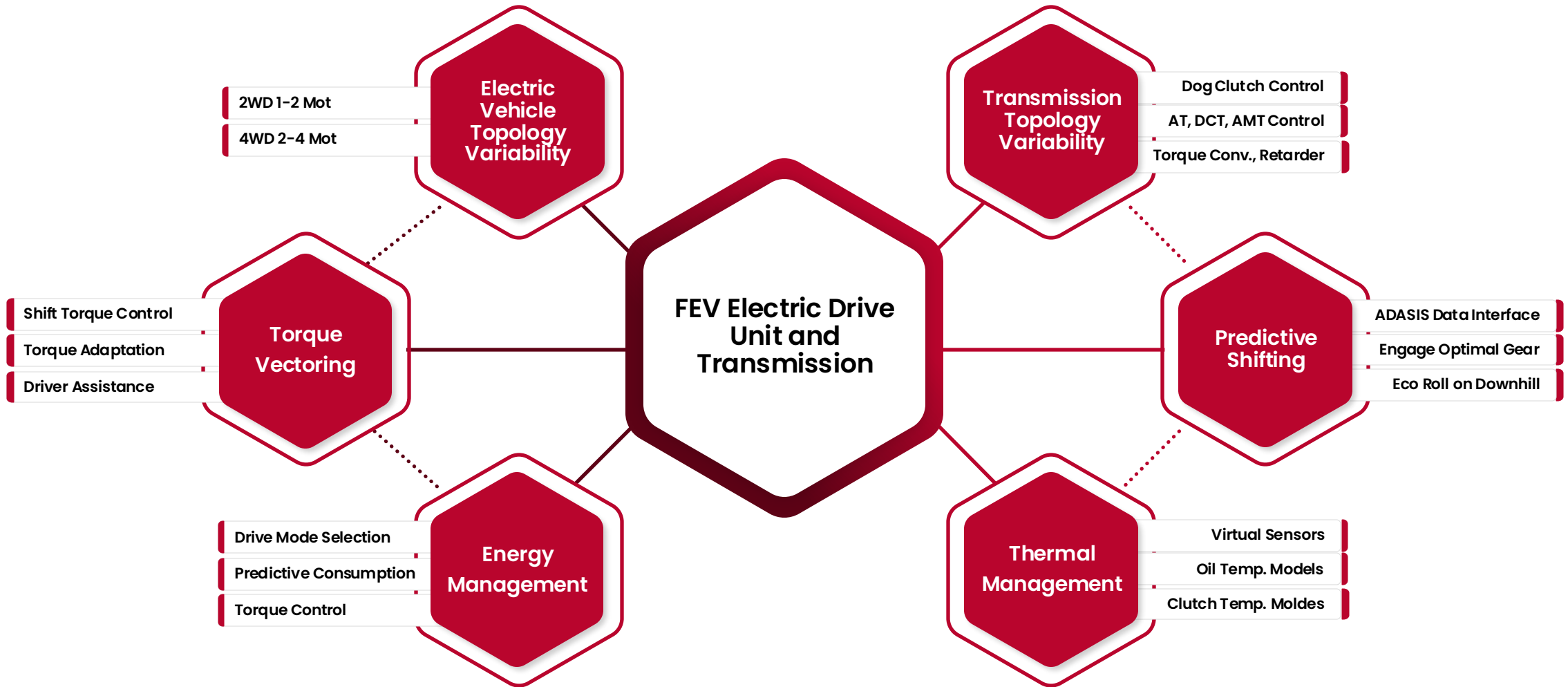
Under load shift control strategy for eBike

RAYMOND, NADA, REMELHE, NOWACK
DE102024123157 (application)

FEV's electric drive unit and transmission control

Developed, defined, approved in FEV's software landscape

FEV ELECTRIC DRIVE UNIT AND TRANSMISSION SOFTWARE AS PART OF FEV'S POWERTRAIN CONTROL SOFTWARE



FEV's unique functions



Dog Clutch Engagement

During engagement and synchronization of the e-machine, the speed of engagement and the torque of the e-machine are regulated in such a way that the dog clutch remains on one tooth contact surface, so that almost no rattling noises occur. Durability can also be increased.



ePTO Speed Control

To avoid additional sensors but still achieve stable speed control, the current load torque is immediately determined via the powertrain inertia and acceleration when a speed deviation from the target value occurs and fed into the speed controller.



eHorizon Predictive Shift Strategy

Based on eHorizon data such as slope and curves and the predicted vehicle speed, the optimal torque and gear are predicted using a high-performance backward dynamic programming algorithm. Additional desired dependencies can be easily integrated due to modular design.



eHorizon Driver Speed Prediction

Using eHorizon data, the current vehicle speed and a determined driving profile over a calibratable section of road ahead, the preceding speed profile is calculated so that a predictive shift strategy can determine a gear even without cruise control and thus reduce consumption.



eBike Shift Control

By monitoring the rider input torque and motor speed, the system predicts the optimal timing to reduce eMotor torque during a gear ratio change. An adjustment occurs at the lowest rider torque point, ensuring a smooth pedaling experience and minimizing mechanical wear.

Get in touch with us for further information



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