



EV/HEV Engineering Services

Applus+ IDIADA offers comprehensive engineering services for electric and hybrid electric vehicle (EV/HEV) development throughout the entire product lifecycle.

Our extensive capabilities allow us to support our clients in every development stage, including concept definition, vehicle architecture, component sourcing, and technical specifications definition.

IDIADA's comprehensive approach encompasses supplier management, concept development, CAD & CAE services, as well as rigorous testing of all major vehicle functionalities.

Our unique in-house facilities allow for thorough evaluation and optimization of EV/HEV systems, ensuring that our clients receive top-quality, market-ready solutions that meet the highest standards of performance and reliability.

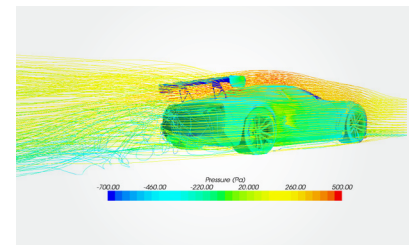
DEVELOPMENT LED BY VEHICLE FUNCTIONALITIES AND PERFORMANCE



BODY DEVELOPMENT: DESIGN & PERFORMANCE

Body engineering play a vital role in EV development, significantly influencing energy efficiency, range, safety, and overall performance. These critical disciplines optimize vehicle structure, aerodynamics, and weight distribution – key factors in maximizing the range and performance of electric vehicles.

- Styling
- Vehicle architecture
- Packaging & feasibility
- BiW development
- Aerodynamic design
- Passive Safety development

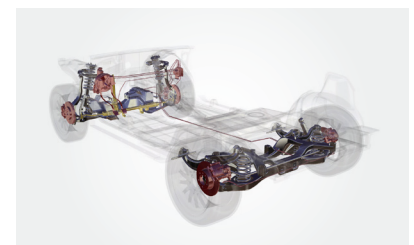


CHASSIS DEVELOPMENT

Our chassis engineering specialists excel in optimizing EV performance, tackling unique challenges such as weight distribution and battery integration.

We ensure superior ride comfort, handling, and safety, striking the perfect balance between efficiency and an exceptional driving experience for EVs.

- Driveline definition and integration
- Regenerative brake
- Steering and suspension systems
- Torque vectoring
- Chassis modules design and integration
- Battery and charging system integration



FUNCTIONAL SAFETY

Functional Safety is paramount in EV development, ensuring the reliability and safety of complex electrical and electronic systems.

Our comprehensive approach safeguards against potential hazards, meeting stringent industry standards and regulatory requirements for EV and HEVs.

- Hazard Analysis and Risk Assessment (HARA)
- ASIL determination
- Safety concept development
- Requirement definition and verification
- Software assessment (MiL, HiL, SiL)
- Design validation



- Multi-motor system safety
- Safety case documentation
- ISO 26262 compliance

POWERTRAIN

PRODUCT DEVELOPMENT FROM FEASIBILITY TO PRODUCTON

FEASIBILITY & DESIGN ENGINEERING

Merging expertise with simulation to achieve vehicle efficiency and performance through accurate technology definitions.

VIRTUAL DEVELOPMENT

Digital solutions using virtual tools, simulations, and digital environments to optimize design, performance, and efficiency.

BENCHMARK & TARGET-SETTING

Physical and virtual benchmarking and data services provision and reverse engineering for cross-functional target-setting.

CONTROL STRATEGIES & CALIBRATION

Control logic definition and calibration of cross-checked features and functions for torque control and energy management.

VALIDATION & VERIFICATION

Definition of validation plan, prototype management, efficient test execution, debugging and data analysis to meet the VTS and market acceptance.

FROM FEASIBILITY TO VALIDATION: ENGINEERING SOLUTIONS LED BY ATTRIBUTES



BATTERY SYSTEMS

Turnkey development: From design to full validation programmes.

- Battery system design and integration
- Battery virtual analysis and validation
- Full engineering support in benchmarking activities
- In-house laboratory for battery systems validation programmes
- HV battery safety concept assessment



CHARGING SYSTEMS

Charging development support, conformity and interoperability at worldwide level



- Standards available: CCS1&2, NACS, GBT, CHAdeMO, OCPP
- Charging architecture definition and standards training
- Development support and dedicated tools
- EVSE market study for test target definition
- Conformance, performance, in-lab and in-field interoperability tests validations
- Enhanced charging functions



POWER ELECTRONICS

Engineering the power electronics validation process: From prototype to SoP.

- Expert support in Validation Plan development
- Benchmarking HV components: Aim for circuitry analysis
- HV safety and architecture consultancy



e-MOTOR & e-AXLE SYSTEMS

15 benches for testing e-motors and e-axes in back-to-back configuration.

- 1 e-motor dyno for hybrid applications and small vehicles
- 1 e-axle dyno available (from Q3 2024)
- Simulation, benchmark, and inverter calibration



PERFORMANCE, RANGE & DRIVEABILITY

Attribute development lead for target-setting and metrics achievement.

- Acceleration performance data and metrics assessment
- High-end support to the driveability tuning and calibration
- Range, energy and efficiency trade-off management
- Functional safety and reliability validation



THERMAL MANAGEMENT & CLIMATE SYSTEMS

Full service in Thermal Management development, integrating virtual and testing tools.

- Virtual development by co-simulation platform
- Design, integration, control and logic definition and calibration
- Test bench development and evaluation in Thermal laboratory
- In-house Climatic Wind Tunnel facility



ENERGY MANAGEMENT

Solutions for energy consumption optimization based on multi-system approach:

| SYSTEMS | CONTROLS | ATTRIBUTES | CERTIFICATION |
|---|---|--|--|
| Efficiency <ul style="list-style-type: none"> • System virtual design | Thermal management <ul style="list-style-type: none"> • Cooling & HVAC system • REES & Charging system | Power performance <ul style="list-style-type: none"> • Torque management • e-Motor and e-Axle | Driving resistance <ul style="list-style-type: none"> • Range optimization • Coast-down reduction |
| | | | Energy consumption <ul style="list-style-type: none"> • Range certification testing and consultancy |

CONTACT INFORMATION

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