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Connected and Cooperative Mobility

Smart mobility is backed by connectivity. And the future of mobility cannot be understood without the **safe development, integration and validation of heterogenous access technologies that interact in a complex ecosystem, bridging the ICT and the automotive domains** and, consequently, transforming the vehicle from a mode of transport into a highly relevant node in the digital world.

This is H1

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Applus IDIADA offers various services that back the industry's needs in the context of **connected and cooperative mobility**, always taking into account its specific needs as well as the ones derived from other technologies such as vehicle automation.

This is H2

This is H2

We provide **expertise and know-how during the entire development cycle**: from the initial concept stages, through to implementation verification, validation and assessment (including XiL, test tracks and open road testing). IDIADA can also support you in your certification needs regarding connected services.

This is H3

This is H3

Engineering Services:

- **Requirement definition:** We can support you in the definition of functional safety, and security requirements for your project including market benchmarks and supplier selection.

- **Prototype, proof of concept and niche development:** IDIADA can fulfil your development needs for targeted and niche concepts where a relatively low number of units are required. IDIADA's iDAPT OBU encompasses all the technologies required for connected and automated vehicle development.

- **C-ITS application and services development:** development, integration and small /large-scale deployment of C-ITS applications and services following customer requirements and objectives (please refer to the C-ITS development section).

- **Aftermarket and vehicle integration:** Integration of TCUs in your EE architecture at development stages and for aftermarket solutions.

Validation and Testing Services:

- **X-in the loop testing:** Integration of connectivity in x-in-the-loop testbenches, test case definition and execution and assessment of tests.

- **Validation in proving ground:** Focused at TCU and/or vehicle level, validation activities include scenario selection, test case definition and execution in state-of-the-art, heterogeneous connectivity enabled test tracks. Assessment of the test results may focus on the vehicle itself or be aligned with its interaction with the network.

- **Performance evaluation:** Driving function performance at application level (e.g. fuel consumption, safety, comfort in platooning) and/or access technology KPI evaluation and impact (latency, throughput, stability).

- **Field operational tests and pilots:** Infotainment, connectivity and connectivity-enabled functions, applications and services objective/subjective testing and assessment on open roads through our international driving capabilities.

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Certification:

Connectivity is also part of regulations for new vehicle type approval. Applus+ IDIADA can support you in your testing and validation of **eCALL**, **ERA GLONASS** and **UNECE AECS** R.144 systems and help you to have them ready in time for official tests. If you have specific requirements on **Radio Type Approval**, we can also support and guide you through the process.

Test Facility Design:

Applus+ IDIADA can also support you in the **design and development of the digital infrastructure of your test facilities and proving ground, fulfilling your clients' requirements based on Applus+ IDIADA's own experience and methodologies.**

C-ITS Development:

Intelligent Transport Systems (ITS) are the **integration of information and communications technology with transport infrastructure, vehicles and users.** By sharing vital data, ITS allow people to get more information from transport networks, in greater safety and with less impact on the environment. Cooperative ITS (C-ITS) is the area of ITS that deals with **real-time information exchange between road users and infrastructure**, enabling advanced applications and services with a huge potential to **increase comfort, mobility and safety.**

Applus+ IDIADA **offers development and small/large-scale deployment of C-ITS applications and services** following customer requirements and objectives:

- Interoperable and scalable architecture at different levels
- Backend services: data aggregation, processing and dissemination
- Frontend services: end-user applications
- Multiple technologies: V2X and cellular
- Large-scale deployment and evaluation
- Implementation and testing of V2X based systems

Applus+ IDIADA provides support in the integration of C-ITS applications into the customer's service portfolio e.g. including **cellular or V2X enabled services** in current ITS platforms and frameworks.

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Our own **IDAPT control OBU for CAV applications integrates V2X radio** with precise positioning, GPU computing and comprehensive I/O to facilitate the prototyping of C-ITS applications, with either standard or tailored messaging.

Facilities Development:

Applus+ IDIADA has also deployed **state-of-the-art testing facilities** to provide the necessary flexibility, robustness and safety for the thorough validation of connected and automated technologies at system and vehicle level. On top of our renowned test track capabilities we build the following digital infrastructure assets:

- Short-range communications: ETSI ITS G5/WAVE (IEEE 802.11p) and C-V2X
- Long-range communications: From 2G to 5G private cellular network
- Annotated, high-definition, digital maps in different formats and standards
- D-GPS correction servers with different formats
- Security and KPI infrastructure
- Different test tracks and scenarios
- Private
- Built on top of our expertise, equipment and assets for ADAS and AD testing

Applus IDIADA has implemented two new initiatives in the context of connected and automated vehicle validation:

- **Connected Vehicle Hub:** Built on top of our existing proving ground in Spain, the Connected Vehicle Hub adds heterogeneous connectivity, closing the gap between the already available physical and digital infrastructure.
- **CAVWay:** A brand new proving ground in the UK, CAVWay has been designed and implemented taking into account current and future needs in ADAS and CAV testing.

Both proving grounds provide all the necessary connectivity assets to offer a flexible, configurable network for the definition and execution of connected vehicle tests and to support the data transmission and acquisition needs of your regular testing activities.