

Lamborghini revs up its diagnostic tool chain with ASAM MCD standardized tools from RA Consulting

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I Summary

Challenge: Lamborghini, a producer of exciting sport cars in small numbers, extended the electronic parts and features during the last years and needed a diagnostics tool chain for the whole life-cycle which fulfilled the requirements of development, production and after-sales with an adequate investment.

Solution: Lamborghini needed an existing and already established diagnostics tool set, which was based on automotive standards. Lamborghini, as an Italian based manufacturer with a high export rate, selected the ASAM AE MCD standards and the OBD/EOBD related ISO Standards as the basis for their diagnostics strategy.

Key Benefits: As an OEM with a limited exclusive production output of less than 2000 vehicles per year, the investment in development is a subject of strong economic restrictions. Using well established standards and standard based tools, which are widely spread, will reduce the costs.

II Situation

Lamborghini, as a brand of the Volkswagen Group, had to join the common diagnostics strategy. For years, the VW Group has been one of the leading users and players of ASAM standards, playing an important role specifying open automotive standards. In the past, VW has selected different diagnostic tool vendors as preferred suppliers. One of them is the leading tool vendor in diagnostics, the Bruchsal, Germany-based RA Consulting GmbH, with their product DiagRA MCD Toolset.

The RA Consulting GmbH product DiagRA MCD was already used by VW Group and by the electronic development department

of Lamborghini because it handled, amongst other tool characteristics, the ASAM standards MCD-1 (XCP), XCP on CAN Interface Reference, XCP on Ethernet Interface Reference, MCD-1 (CCP), MCD-2MC (ASAP2/A2L), MCD-2D (ODX), ASAP3 (Interface Specification).

The heart of the electronics assembly is the Lamborghini engine management, which is based upon the excellent know-how of Lamborghini in this field. This system is connected with the Lamborghini GFA on-board vehicle computer and with i.e. e-gear, antilock braking system/Electronic Stabilization Program, the electronic control units (ECU) in the dashboard and other satellite ECUs (door modules, air condition, rear spoiler, comfort/infotainment) over a sophisticated CAN bus network.

III Challenges

After using the DiagRA MCD Toolset for the development department, the next step was a special DiagRA version, named LaRA EOL, for the Lamborghini production. This new version had to allow a maximum of flexibility and mobility for the production processes. For the end-of-line use, a script language based workflow management system had to be created. This script tool had to be effectively programmable and had to be an easy-to-use solution for any workers on the production line. Because of the very limited number of authorized Lamborghini dealers in the world, there was a prompt demand for a tester system as well. This tester was designed to the restricted, but specific requirements of Lamborghini maintenance procedures. There was a special document-based derived fault analysis, which was integrated in the tester version of LaRA AS.

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IV **Success strategy**

The number of cars and the increased number of electronic components in the new Lamborghini sports car, L140 (Gallardo), prompted the need for a new system for the automatic initial start up on the assembly line and on the refinishing stations.

Depending on the parts list, corresponding setup procedures must be carried out. These setup procedures are assembled car-specific by a LaRA configurator. In a final setup, at the end, the electronic control units are programmed. Lamborghini chose a specially-adapted version of DiagRA to do this - the tool LaRA-EOL. In this tool, the user chooses test procedures generated by the configurator over an interface, which is easy to use. These procedures are then executed by LaRA-EOL automatically. The configurator can be parameterized for new functions, new parts, new processes or electronic control units, without having to be recompiled. The complete system provided by the RA Automotive department is not only suitable for setting up cars, but could be used for testing and after-sale diagnostics work as well. And because of its mobility, it could be used inside the factory, on the highway and at any other location, like Lamborghini garages – which is practically anywhere.

Documentation; archiving in an ORACLE XML database; an efficient reporting via a browser-based application; the process controlling; and, the integration of third-party systems have to be performed. The whole sequence of actions is executed by different people, with different assigned tasks and with different rights. The system provides a role concept for effective and secure working with the different subsystems. Lamborghini is now applying RA Consulting special automotive know-how and its many years of database experience to its beautiful new “parade bull project” - the Gallardo.



Mobile EOL programming and testing at the Gallardo production line

V **Challenges and business benefits during the project**

The main challenge was the time schedule left to the SOP (start of production). From the first contact - to the realisation, it only took Lamborghini and RA Consulting 6 months to implement and set up this solution.

The second challenge was to create a flexible and mobile solution. This tough schedule could only be realized because the specific application was based on a standardised ASAM MCD software product. Only the OEM specific features had to be implemented by using standards on the lower implementation levels.

The third challenge was to create an economical solution of a limited vehicle production. The system allows any non expensive change in the production flow, through its mobility. The solution is using mobile devices, which are connected in different communication technologies, including secured WLAN and Bluetooth communication.

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