

ASAM GDI speeds up HiL test stand configuration at general motors

“I chose ASAM, because I believe that standards supported by a strong community of OEMs and suppliers enable vendor independent solutions that generate more flexibility at the same time as it enables a common understanding between the involved parties.”

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i Summary

Enable easy integration of various system configurations in HiL (hardware in the loop) test stands to represent different platforms and car vehicle scenarios. While plug and play of devices and subsystem is desirable, real time, synchronous performance and low latencies are simultaneous requirements.

GM has decided to use ASAM GDI in its current Version 4.3 as the standard to allow exchange of devices and subsystems as well as the connected application(s).

While the MDAQ companion standard guarantees plug and play of the devices the GDI Coordinator Reference Implementation for Windows generates a common interface to the HiL application. GDI enables fast integration of devices, subsystems and applications it allows the use or migration of various technologies and platforms.

ii Situation

Test and automation systems mostly use integration environments that require proprietary drivers for each connected device or subsystem. Each of these individual connections needs to be supported and thus allocates valuable resources, increases cost with every change and adds unnecessary time to perform the needed integration. The existing of such a inhomogeneous situation involves time and effort of the OEM, the system integrator and the device and subsystem supplier at the same time.

iii Challenges faced

The rapidly changing requirements to HiL tests scenarios require a flexible integration strategy to enable an optimum of test results rather than setting the focus to the integration task of the involved subsystems and software packages. New communication networks and applied technologies within the cars today and shorter innovation cycles force test technologies to keep up with this increased demand of quality control and functional testing.

To ensure that testing is entirely focused on generating the required results, develop test strategies and data evaluation, it is necessary to share common methods between OEMs, test and automation and device suppliers. Implementations still seem to have a very strong relation to the selected technology that forms an acceptance problem negotiating on a common standard.

Applying a standard may not be the easiest route in implementing a specific connection when seen as a 1 to 1 relation between one device supplier and one test- and automation system vendor.

iv Solution

GM decided to generate the planned integration platform utilizing ASAM GDI 4.3 with existing companion standards and reference implementations with the help of a US engineering company doing integration work today, existing components for the GDI integration framework from Europe and

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several subsystem vendors. The implemented solution that exists today has been implemented on a Windows platform based on the Coordinator Reference Implementation 1.0 using serial interfaces rs232, IP4 (Ethernet) and USB. Beside the GDI environment there is an application coordinator that allows parallel test sequences performed by more than one application using the systems devices and even interact as needed.

Drivers that had to be developed have been related to the MDAQ 1.2 companion standard to use existing device models, DCDs (device capability descriptions) and driver skeletons.

v Challenges during the project

Implementing the GDI environment required a common understanding of the target system in order to generate the optimum device

models and system setup and integration procedures. In terms of opportunities, the selected ASAM GDI route allows any vendor to offer their systems and services with no additional cost because the number of supported implementations is reduced to one. Synchronization on several levels becomes a real challenge as well as a common way to generate system persistence that allows easy system start up routines. Integration of applications and devices at the same time requires a good understanding of application free and device free interface levels.

vi Benefits

In terms of opportunities, the selected ASAM GDI route allows any vendor to offer their systems and services with no additional cost because the number of supported implementations is reduced. Integration effort and time can easily be saved because the partners do not need to define, generate and maintain proprietary interfaces. It is simple to see that each new software, subsystem or device that is added to the test stand will reduce the overall cost and effort related to the number of components supported at the same time.

HiL Test Bench Architecture

