

Multilingual Windows™ software development for a major automotive systems supplier



Background

A requirement arose, within a leading Tier 1 supplier of chassis systems to the automotive market, for the development of a software tool to perform a specific application for one of their customers, a major vehicle manufacturer.

The software was to be suitable for rollout to a worldwide dealer network, and would permit the dealer's operators to connect to the vehicle (via the standard on-board diagnostics connector) communicate over the CANbus with the steering system, extract a "signature" dependent upon various parameters of the vehicle, and determine automatically, on the basis of this signature, whether or not a specific software upgrade should be performed.

The tool was required to then manage the entire process of automatically downloading the upgraded software, reprogramming the steering system's internal Flash memory and then guiding the operator through a sequence of tests on the steering system.

Also required was that the tool, running on the range of standard PCs and operating systems in use by the dealers, should operate on top of a software and hardware layer already provided by the vehicle manufacturer for use by their dealers (for which full technical details were not accessible to Timestar or their client) and should be highly robust with regard to the electrically and mechanically hostile environment in which it would be required to function.

Automatic selection of one of 22 supported languages, with a simple user-friendly facility to select an alternative after invoking the software, was also required.

Project details

Timestar won the contract in 2 stages, both on a fixed price basis.

The objective of the first stage, required on a very short timescale, was the demonstration of 100% successful management of the complex process of retrieving the "signature" referred to above and then, if appropriate, downloading the upgraded executable code, handling any communications errors or interruptions during this process, and then actioning the reprogramming operation and verifying its success.

The acceptance criteria were defined in terms of 100% successful reprogramming of several different hardware units, each operation being repeated a specified number of times.

With this objective successfully achieved, the second phase of the contract was awarded. This involved a Failure Modes and Effects Analysis (FMEA) to exhaustively consider the possible scenarios in which the tool would be used, taking into account such factors as vehicle battery state, PC battery state, unintentional disconnections and any possible operator errors.

On the basis of this FMEA a robust sequence of steps was defined so as to combine as necessary operations requiring communication between the PC and the steering system with steps requiring user input, and specify a list of clear and unambiguous instructions and informative messages to the operator, which could subsequently be translated into the various supported languages.



Figure 1: Graphical User Interface

A simple Graphical User Interface was then created to implement this sequence, and communicate with the underlying reprogramming "engine" developed in the earlier part of the project and now separated into a DLL.

Timestar attended, with their client's staff, meetings at one of the vehicle manufacturer's overseas sites as part of the process of clarifying requirements and confirming acceptable performance.

Success in service

The tool was successfully completed to the client's and the vehicle manufacturer's satisfaction, and is now in use across the dealer network.



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