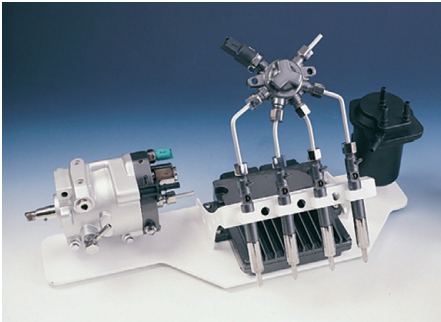


# Delphi Diesel Systems Ensures Software Reliability and Reduces Time to Market



*Delphi Diesel common rail system.*

As part of the Energy & Chassis division of Delphi Corporation, Delphi Diesel Systems develops diesel fuel-injection systems for light-, medium-, and heavy-duty vehicles. A major goal of Delphi Diesel Systems is the delivery of innovative diesel injector technology to enable global OEM automotive customers to reduce noise levels, pollutant emissions, fuel consumption, and torque.

Polyspace™ Client for C/C++ and Polyspace™ Server for C/C++ help Delphi Diesel Systems ensure software reliability and accelerate development by pinpointing run-time errors in the code as soon as it is written.

“Allowing us to detect bugs much more quickly than with classical time-consuming testing methods is by itself of great value,” notes Frédéric Retailleau, software verification team leader for Delphi Diesel Systems at Blois, France. “On top of that, using Polyspace as soon as source code is available helps us catch bugs much earlier and thus at a much lower cost.”

### The Challenge

“The main concern with the development of diesel injector control software is the high number of calibrations,” explains Retailleau.

“In a typical application containing 200,000 lines of code, there are thousands of calibration points. These constants may be changed after software delivery by calibration teams, potentially modifying the behavior of the whole application. This characteristic leads to extreme difficulties when it comes to performing tests.”

Because fuel-injection systems increasingly rely on electronics, the reliability of embedded software is crucial. Poor reliability can lead to product recalls, which are not only costly but also detrimental to the company’s image over the long term. At the same time, Delphi Diesel Systems cannot slow development in its attempt to improve reliability. Delphi Diesel Systems needed a software analysis tool that would enable the software verification team to ensure reliability while increasing productivity and development speed.

### The Solution

The Delphi Diesel Systems team evaluated Polyspace tools by using them to analyze some existing applications. Polyspace products for C/C++ identified errors in software that had been considered fully tested.

### The Challenge

Automatically find run-time errors in embedded software for diesel fuel-injection systems

### The Solution

Use Polyspace products to analyze embedded code and pinpoint reliability problems

### The Results

- Debugging time reduced
- Reverification automated
- Customer confidence increased

*“Using Polyspace products as soon as source code is available helps us catch bugs much earlier and thus at a much lower cost.” —FRÉDÉRIC RETAILLEAU, DELPHI DIESEL SYSTEMS*

Based on the results of this evaluation, the team decided to integrate Polyspace tools into its testing process. They applied them as early as possible in the process, before functional unit tests, to maximize development efficiency and address testing difficulties caused by the calibration issue.

In this new unit test process, the Blois team systematically used Polyspace tools to analyze software modules as soon as they were developed.

Using Polyspace products, they automatically identified run-time errors in the diesel fuel-injection system’s embedded software, eliminating time-consuming robustness tests that frequently provided inadequate results.

## The Results

**Debugging time reduced.** “Dynamic testing merely allowed us to detect the symptoms of the errors,” says Retailleau. “Polyspace code verification pinpoints their root cause, saving us significant debugging efforts.”

**Reverification automated.** “Because the analysis is entirely automatic, evaluating the consequences of small modifications to the software is also quicker with Polyspace products,” notes Retailleau.

**Customer confidence increased.** “We want to let our customers know that we use state-of-the-art tools for the detection of run-time errors,” Retailleau says. “We definitely use our best efforts to ensure the reliability of our embedded diesel injection control software.”

## Industry

- Automotive

## Application Areas

- Verification, validation, and test
- Control systems

## Products Used

- Polyspace™ Client for C/C++
- Polyspace™ Server for C/C++

## Learn More About Delphi Diesel Systems

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