Goal
Design a NOR flash memory solution that is safe, reliable, and meets the stringent automotive safety requirements for advanced driver assistance systems (ADAS) at an extreme temperature of 125°C.

Solution
Cypress embedded an Arm Cortex-M0 in its new family of NOR flash memory solutions, enabling the processing of complex embedded algorithms for enhanced, more reliable memory, as well as real-time functional safety monitoring to the industry’s stringent ISO 26262 standard.

Benefits of their solution
+ Industry-leading functional safety and reliability: Architected and designed according to ISO 26262 standards
+ New wear-levelling algorithms enabled by the Cortex-M0 for either 25 year data retention or 1.25 million writes
+ Enhanced memory to address new problems solvable within the memory
+ Improved performance with exceptional code density to significantly reduce memory requirements, leading to reduced memory cost and power
+ Simplified software development through the Arm ecosystem which provides industry-standard software tools, operating systems, resources and training

Cypress Semiconductor Corporation is a leading American semiconductor design and manufacturing company, headquartered in San Jose, California. The company recently released Semper, a new family of NOR flash memory solutions designed to deliver a combination of safety and reliability for automotive and industrial applications.

Targeted specifically at the Advanced Driver Assistance Systems (ADAS) market, the Semper Flash family is the first memory architected and designed to meet the automotive industry’s stringent ISO 26262 functional safety standard for building fail-safe embedded automotive systems.
“Moving to an Arm-based microcontroller has enabled us to program far more quickly, using industry-standard tools that our designers were already familiar with.”

“About half of our NOR flash revenue comes from the automotive market, so it was critical that this new product family operated with very high levels of functional safety compliance to protect against system failures,” said Rainer Hoehler, Vice President of the Flash Business Unit at Cypress. “This meant adopting a completely new approach to our product architecture.”

Cypress embedded an Arm Cortex-M0 processor inside its design, enabling secure boot, processing of complex embedded algorithms, detection and correction of memory errors, real-time functional safety diagnostics, and partition management. The exceptionally small silicon area, low power, and minimal code footprint make the Arm Cortex-M0 an ideal choice for automotive applications.

Cortex-M0 also enables intelligent wear levelling; storage can be partitioned and configured for either 25 years of data retention or write endurance of over 1.25 million writes.

“We chose Cortex-M0 as it provides us with the flexibility to manage the enhanced features at the lowest power for the performance we need,” Hoehler explains. “It’s also ideal for overseeing the boot process, as in an ADAS implementation you can’t afford for the memory to fail or be compromised.”

The Arm ecosystem also enabled Cypress to develop software solutions faster than ever before. “Moving to an Arm-based microcontroller has enabled us to program far more quickly, using industry-standard tools that our designers were already familiar with.”

More information on the Semper Flash family is available at cypress.com/semper-flash

See these related links for more information:

- The Arm Cortex-M0 processor
- The Cypress Semper Flash family
- Arm storage solutions
- Arm automotive solutions
- Arm functional safety solutions