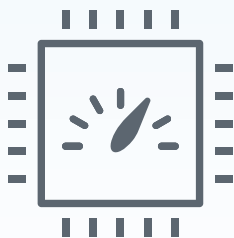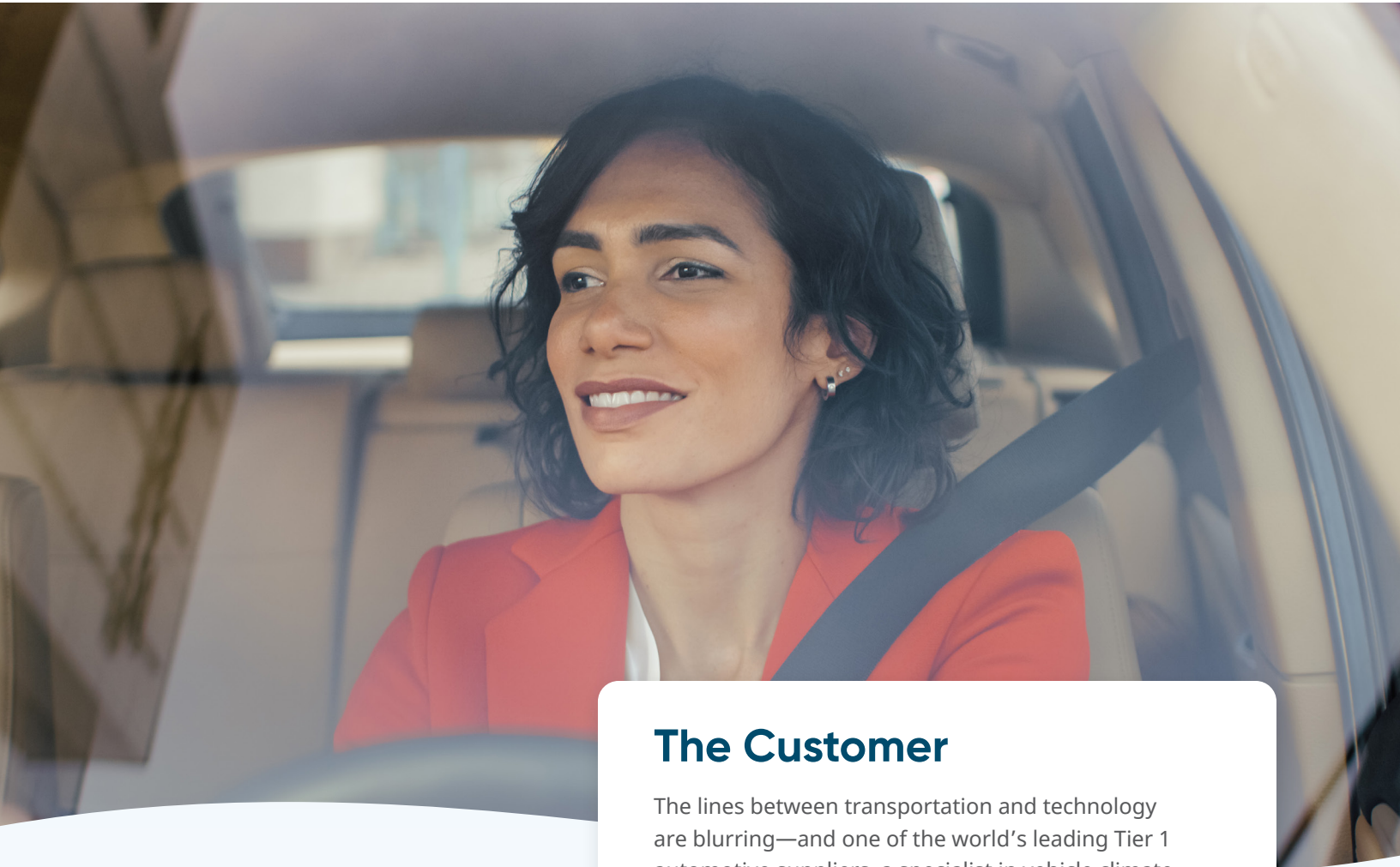# Altia Saves Tier 1 Auto Supplier's Climate Control HMI Program with Ultra-Low Power Code Solution

The Customer

The lines between transportation and technology are blurring—and one of the world's leading Tier 1 automotive suppliers, a specialist in vehicle climate control and thermal management, is helping OEMs manage the transition. Based in Europe and employing nearly 3,000 people at facilities around the world, the supplier serves a roster of automakers in Europe, Asia and the United States.

As a premier design and production resource, the company is known for their innovation in solving unusually difficult human-machine interface (HMI) challenges, ensuring highly intuitive and ergonomic solutions for all classes of vehicles.

The Challenge

Recently, this supplier was presented with a particularly tough assignment involving a dedicated display/control system for the HVAC in a European auto manufacturer's high-end luxury sedan. At the center of the challenge was the embedded hardware: a Renesas RL78 microcontroller paired with a Yamaha VC1 graphics controller.

"The Yamaha VC1 is a very specialized part," commented Brett Stein, Altia Vice President of Operations. "It accesses flash memory directly and takes its commands from a microcontroller with only 11KB of available RAM."

At the time, the supplier was using a Yamaha-provided tool to design the HMI graphics and related software. The limited functionality of the tool, however, was causing performance and memory issues. It was having difficulty accommodating the high-end HMI design intended for this luxury automobile.

With the project's delivery date fast approaching, the supplier was running out of options. The tool was not offering the performance required for a smooth user experience. The deadline was around the corner, and the supplier was in danger of losing the program.

The Solution

In search of answers, the Tier 1 supplier contacted Altia's Professional Engineering Services Group. The Altia team demonstrated what they could do to fix the memory and bandwidth problems— and without missing the production deadline.

Central to the Altia Services Group solution was Altia's implementation of miniGL to optimize the supplier's design. A part of Altia's DeepScreen code generator, the miniGL implementation packs data in a highly efficient manner for resource-restricted microcontroller targets. "Altia miniGL code

is extremely well optimized in terms of RAM consumption," Stein noted. "This gives designers more latitude in terms of their discrete device displays. It's even possible to simulate 3D graphics."

Altia's Services Group was able to work within the RAM constraints of the microprocessor, bandwidth limitations between the VC1 and flash memory, all while optimizing the HMI logic for a successful implementation. The solution provided better memory consumption, better overall performance and, best of all, within the processing constraints of the MCU.

The Results

Altia's turnkey solution gave the supplier what they needed for their OEM program. Moreover, the code was delivered on time, thus making the project a success. Due to the efficiency of the software, the supplier was actually able to extend their Altia resources, creating a multiple display configuration using the same VC1 target. This was a major achievement—a design of unprecedented performance using a very memory- and bandwidth-constrained hardware target.

"No other tool vendor in the world could provide such a robust HMI solution on that very limited, specialized hardware platform," noted Stein.

Based on the Altia Services Group implementation, the supplier went on to use Altia DeepScreen for another dedicated display, this time for another European OEM. The display solved a

different HMI problem: controlling the process of raising and lower a camper van roof while using the same embedded hardware platform.

"Altia's Professional Engineering Services Group, along with Altia's DeepScreen, have extended our ability to satisfy unusual and demanding assignments, including those involving low-power targets like the RL78," stated the Tier 1 supplier's Director of Advanced Software Engineering. "This partnership has been very beneficial and has enabled us to remain responsive to our customers' needs in a very competitive systems segment."

Contact Us

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