Multi-Function Lamp

A compact, safety-certified solution for agricultural vehicles, developed in compliance with ISO 25119

01 THE CHALLENGE

Traditionally, agricultural vehicles relied on multiple discrete lamps to meet their lighting requirements, white a separate hardware unit for each function. This approach increased wiring complexity, consumed more physical space, and raised maintenance overhead.

02 THE SOLUTION

We addressed this challenge by consolidating multiple lighting functions into a single, configurable unit, reducing hardware complexity and simplifying vehicle integration.

Leveraging our expertise in functional safety, from hazard analysis through to validation, we helped ensure compliance with safety standards while streamlining the development process.

By adopting CI/CD pipelines and automated testing, we accelerated delivery cycles, improved defect detection, and enhanced maintainability.

Close collaboration between multidisciplinary teams across hardware, software, and safety domains enabled seamless integration.

The system architecture and software were also designed for future reuse and adaptability across different lighting configurations, ensuring long-term value for the client.

03 THE RESULTS

The outcome is a streamlined, modular lighting solution that reduces the hardware footprint and simplifies both vehicle assembly and diagnostics. It integrates multiple functions into a single, compact unit.

04 TECHNICAL HIGHLIGHTS

- Built around a single PCB with a microcontroller that manages LED groups for Direction Indicator, Front Position Light, Side Marker Light, and Flash Warning Light configuration. It communicates via LIN 2.2 protocol as a slave device, ensuring compatibility with standard vehicle ECUs.
- Developed to meet AgPLr A and SRL B safety levels under ISO 25119. It includes modules for LIN communication, LED control, diagnostics, and fault handling. The software architecture supports variant detection at boot time, enabling reuse across different configurations.
- A comprehensive safety case was created, detailing hazard analysis, risk classification, and mitigation strategies. It includes safe-state definitions for various fault scenarios, such as LIN communication loss or LED failure.
- An automated toolchain using CI/CD pipelines ensures traceability and compliance, with automated testing and static analysis integrated into the workflow.
- The project was ISO 25119 compliant, with rigorous documentation and review cycles.

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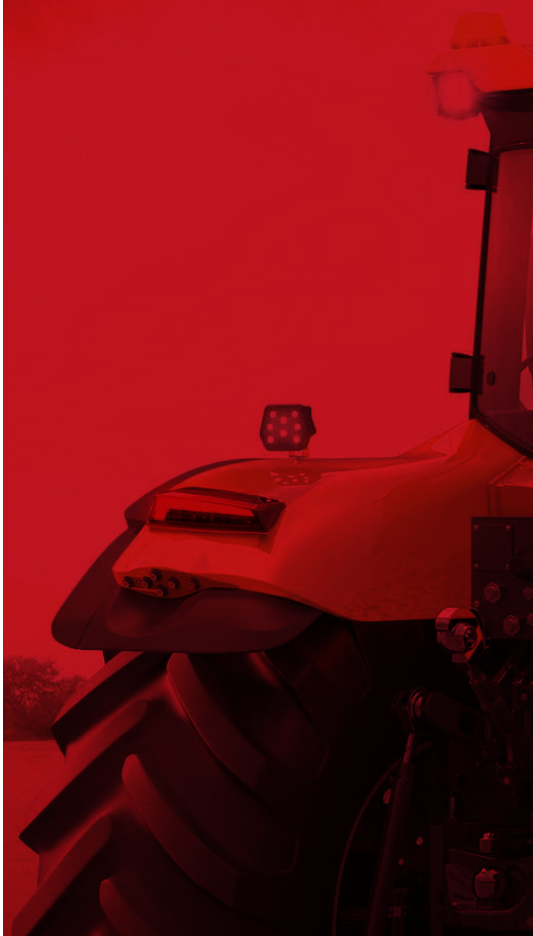

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We were founded in 1998, with NASA our very first client. Today, we work across many international industries and have offices across the globe.

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