

The DCAS Bridge

- Understanding Regulatory Progression from Traditional ADAS to Full Automotive Automation -

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This paper examines the critical transition from Advanced Driver Assistance Systems (ADAS) to Driving Control Assistance Systems (DCAS) under the new UN Regulation No. 171 (R171). As automated driving technologies progress toward higher levels of automation, R171 represents a pivotal regulatory evolution that addresses the limitations of previous frameworks. The study identifies three fundamental implementation challenges—simulation validation, open-road testing, and in-service monitoring—and analyzes their implications for the automotive industry's path toward full automation.

Key Points:

Regulatory Evolution

UN R171 marks a significant departure from the lane-keeping-focused UN R79, expanding the regulatory scope to encompass more advanced automated driving functions. This evolution acknowledges the increasing sophistication of vehicle automation systems and establishes a comprehensive framework for DCAS technologies that bridge the gap between current ADAS capabilities and future autonomous vehicles.

Three Main Implementation Challenges

1. *Simulation Validation*: Establishing robust simulation frameworks that can accurately replicate real-world scenarios and validate DCAS performance across diverse operating conditions.

2. *Open-Road Testing*: Developing comprehensive testing protocols for real-world validation that ensure safety while capturing the complexity and variability of actual driving environments.

3. *In-Service Monitoring*: Implementing continuous monitoring systems to track DCAS performance throughout the vehicle lifecycle, ensuring ongoing compliance and identifying potential safety issues in production vehicles.

Implications for Higher Automation

The challenges and solutions identified in implementing R171 for DCAS provide crucial insights for the development of higher automation levels (SAE L3 and beyond). The regulatory framework and validation methodologies established through DCAS serve as foundational elements for future autonomous driving systems, shaping industry standards and safety requirements for next-generation automated vehicles.

Conclusion

The DCAS Bridge represents both a regulatory milestone and a practical roadmap for the automotive industry's evolution toward higher automation. By addressing the three core challenges of simulation validation, open-road testing, and in-service monitoring, stakeholders can establish a robust foundation for safe and effective automated driving systems. The successful implementation of R171 will serve as a critical stepping stone toward realizing the full potential of autonomous mobility.