

Case Study.
Waymo.
North America.
Transportation.

Automated Vehicles Safety Management System

Background

The autonomous vehicle industry sits at the intersection of three different business sectors: automotive, information technology, and transportation services and operations. Development and commercialization of automated vehicles (AVs) requires integrating these sectors to effectively develop, test, deploy, and refine AV technologies while ensuring safety for employees, customers, the public, and other motorists. This is a complex task as the AV industry is governed by safety regulations and requirements that are still emerging. As a result, Safety Management Systems (SMS) deployed by AV companies must address challenges with industry sector convergence, a maturing regulatory environment, while building confidence in the safe use of AV technologies by the public.

Challenge

With a mission "to be the world's most trusted driver" Waymo has pioneered commercial deployment of AV technology. In doing so, Waymo's SMS extends across the enterprise's entire value chain from design and engineering, to manufacturing and operations, through asset replacement or retirement. This is a tremendously complex task requiring broad safety expertise across business sector participants, as well as specialized technical expertise in hazards found in cutting-edge industries.

Waymo's SMS establishes a comprehensive and consistent risk-based approach to manage safety processes and controls across its entire value chain. The direct effect is to improve proactive management of safety issues, with the additional benefits of



strengthening operational effectiveness, stakeholder relationships, resiliency, and reducing long term costs. Waymo faced significant challenges in developing a transparent SMS due to the highly confidential nature of its technologies, rapidly evolving industry regulations and standards, and the complexity of integrating diverse business sectors to deliver autonomous vehicles.

dss+ Approach

To assist Waymo, dss+ performed a baseline assessment of Waymo's existing SMS framework, organizational structure and roles and responsibilities, including those of third-party contracted services providers. dss+ also identified and reviewed existing operational, engineering, and safety management processes and procedures, in order to document key SMS interfaces and opportunities for improvement. Key elements reviewed included review of contract language, hazard and risk management, safety communication, and examination of resources to support technical capacity to support the SMS over the short, medium, and long-terms. The team also compiled relevant research into SMS standards and frameworks from a variety of industries to increase the breadth of Waymo's own SMS.

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Waymo used the results of this baseline assessment to improve its harmonized and comprehensive SMS framework. These enhancements included the development of an end-to-end risk-based hazard management process and refinement of Waymo's operational risk management tools and processes. In addition, dss+ helped revise new key performance indicators and contract language to better support future third party services in strengthening SMS adoption and performance. The team also provided specialized system safety engineering expertise for analysis of fire and life safety, contractor fatigue risk management, non-collision hazards, operational safety, and emergency response.



Assignment

Support development of an integrated SMS framework to address the enterprise's entire value chain and set the SMS benchmark for the AV industry. Provide specialized system safety engineering and hazard analysis technical services.



Offering

Operational Risk Management Consulting



Impact

- Conducted a baseline assessment of Waymo's unique SMS and the AV industry, with recommendations for inclusion of more comprehensive SMS elements.
- Strengthened contracting language for safety, as well as processes to improve fatigue risk management and other areas of AV operational safety.
- Supported and validated the newly designed new risk assessment and hazard analysis processes to improve integration of risk-based decision making between engineering and operating practices.



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