

Workshop Series 1: Introduction to SMS and ADS

Over the previous two weeks, MITRE, Aurora, and Zoox hosted a virtual forum on Safety Management Systems (SMS) and their application to the innovative and fast-paced automated driving domain. This forum consisted of two events; an initial virtual meeting to level-set participants on SMS and provide initial context, and a second event consisting of a short overview of SMS and three breakout sessions discussing various aspects of SMS—corporate culture, obstacles to implementation, and harnessing organizational data. The MITRE team is excited to discuss the takeaways from this first meeting and plan new engagements this summer to aid in SMS implementation, all to support the safe and successful automation of the transportation ecosystem.

In the first session, held on April 15th, the team focused on providing context around SMS, a concept that can often seem daunting. What is SMS? Who has implemented it, and what do they have to say about the process and the outcomes? To answer these questions, MITRE moderated a panel discussion with four experts representing a variety of domains and organizations: from aviation, from nuclear energy and chemical production, and two experts from automated driving innovators. The discussion highlighted how siloed safety efforts within an organization, with a reactive focus to safety events, hampered organizational safety. As industries moved towards an organization-wide safety approach, built on a cultural shift towards trusted and methodical safety methods, the improvements were remarkable. Some effects were unintended, such as smoother mergers and acquisitions or a more collaborative relationship with regulatory bodies. Each panelist shared stories from their experiences implementing safety regimes in their respective environments, with their unique challenges and outcomes. The key theme from all speakers in each domain—aviation, nuclear, chemical, and automated driving—was this: we don't compete on safety. While often safety management is implemented as a reaction to catastrophic events, the panelists encouraged the industry to take this opportunity to be proactive and collaborative within their organization and build an SMS approach that evolves with technology. This integrated approach will provide the smoothest and most beneficial path for organizations as they work to safely develop and deploy automated driving systems.

The second session, held on April 20th, followed up with additional details on SMS and with breakout sessions to explore key aspects of implementation. The objectives of this session were to hear from forum participants directly regarding their thoughts and experiences with SMS. MITRE started the forum with a brief curated presentation from an SMS subject matter expert highlighting its core components. Content included a description of organizational safety failures, aspects of a positive safety culture, and the safety management framework. The Four Pillars of SMS were presented: Policy, Promotion, Risk Management, and Assurance. After, MITRE asked the community to think about how we can come together to improve safety fleet-wide. The group then split into the three breakout sessions to start conversations around aspects of SMS implementation.

In the breakout titled “Evolving your Safety Culture,” participants highlighted that leadership is a focal point in safety management—and their commitment to safety must permeate throughout the

organization. Employees must feel empowered to act on safety and must be rewarded for doing so. The group discussed ways to measure safety culture, such as surveys or safety performance indicators (SPIs). Challenges were identified around maintaining enthusiastic leadership commitment and in sharing lessons learned across an organization. The message was clear: in SMS, the focus must be on the people.

The second breakout, titled “Harnessing Organizational Data for SMS,” discussed how organizational-level data can be used to inform safety decisions. This type of data is in addition to operational or sub-system data, often the focus of safety programs through hazard analysis and root cause analysis. The group discussed how trying to make the organizational safety case is essentially trying to prove the null hypothesis; that a system does not contain unacceptable risk. Data is often hard to evaluate, such as safety concern reporting rates. The breakout identified how data needs to be proactive, not reactive, and help them identify new safety risks before they materialize. Possible future efforts surrounding this topic include how to gather data in an organization with varying cultures; how to identify and separate operational from organizational indicators; building a list of example organizational safety performance indicators (SPIs) to help with implementation of SMS; and how an organization can effectively define success metrics when implementing SMS.

The final breakout, titled “Obstacles to Integrating SMS into Existing Operations,” focused on identifying key roadblocks when evolving an SMS. Through a group poll, primary obstacles include the perception that an organization already “does” safety well; that resources are limited; that, in this cutting edge and innovative industry, companies are focused on solutions and do not want to be slowed down; and that safety is hard to measure for AVs. The group discussed ways that they had addresses these issues, including that there is a clear business case to be made about the benefits of SMS. Details about how to test organizational safety systems, including how to integrate with self-certification, were also discussed. Ultimately, the lively conversation highlighted that leadership must be bought into SMS, and that doing so requires that safety be effectively measured—because it’s hard to manage something that isn’t effectively measured.

In summary, these two days presented an introduction and common understanding of Safety Management Systems. After engaging discussion with stakeholders from across the industry and research spectrums, MITRE is excited to continue working with the automated driving community to empower organizational safety through SMS. Future workshops will be created based on pain points and needs identified by participants in these first two sessions. On behalf of all of our event co-hosts, MITRE thanks you for attending this forum and looks forward to future collaboration.