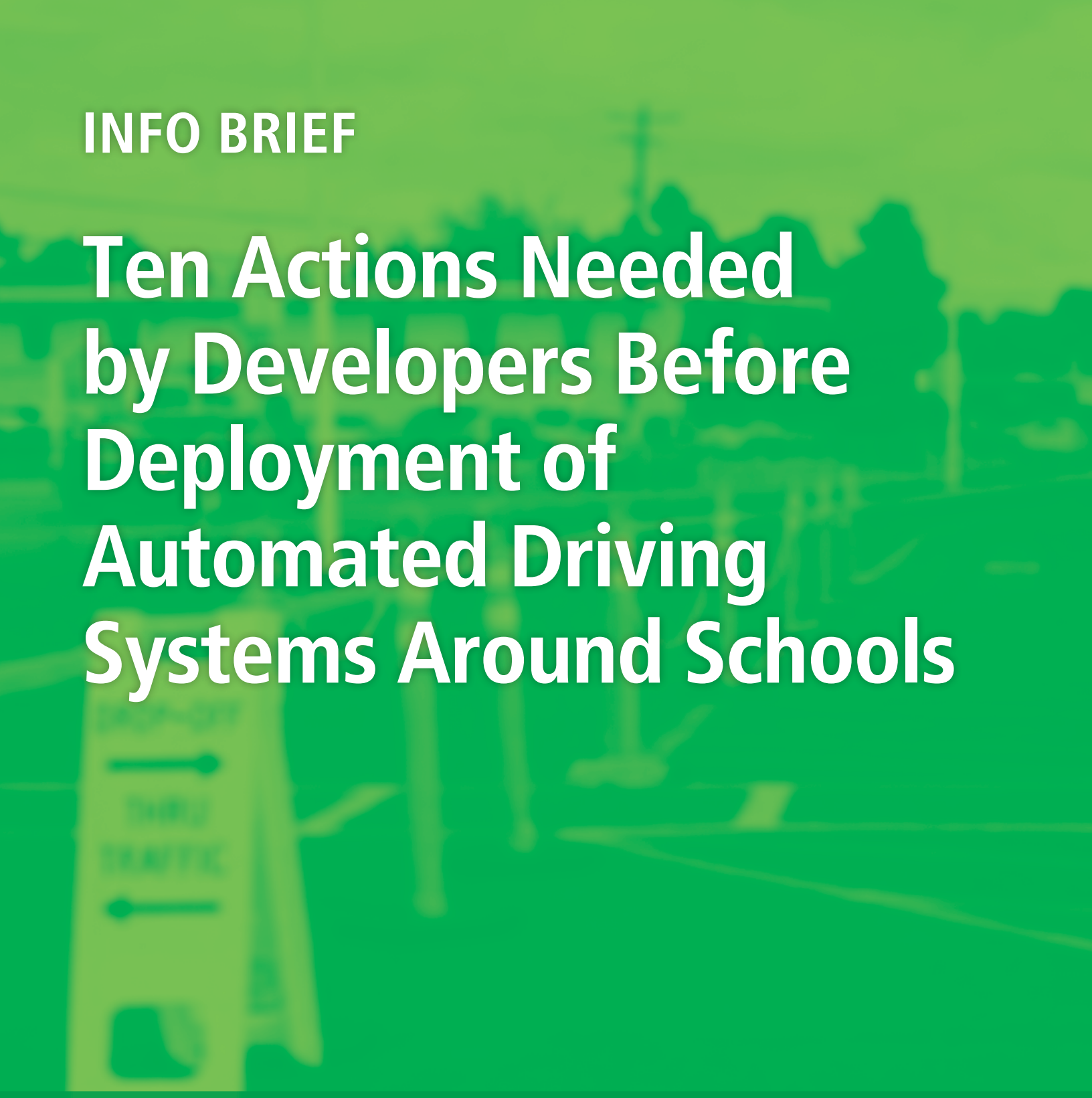
INFO BRIEF

Ten Actions Needed by Developers Before Deployment of Automated Driving Systems Around Schools



Pedestrian and Bicycle Information Center
www.pedbikeinfo.org

While automated driving systems (ADS) are broadly expected to improve highway safety, there are some operational domains for which they are not yet prepared. Schools are one of these domains due to the unpredictability of student pedestrians, the inconsistent environment and safety risks unique to arriving and leaving school areas, and other challenges. It is important that ADS developers understand and collaborate with school stakeholders to address these challenges so appropriate technology, design, and regulatory approaches can be implemented before ADS are deployed in school zones.

Although a global pandemic keeps many students away from school at present, ADS research and development continues to advance. Therefore, it remains important to consider the additional complexity ADS will face when navigating near schools and how the technology influences safety. These ten recommendations address the variety of technical, policy, infrastructure, and educational challenges faced by ADS developers and local stakeholders prior to broad deployment.[1]

1. ADS should consistently comply with school zone traffic regulations.

Unlike public roads, there is no universally agreed-upon or enforced standard for managing traffic on or adjacent to school property. There can be tremendous variability among schools and training an ADS to navigate in one specific school may provide little or no information about navigating another.

2. ADS developers should work with school administrators to understand pick-up and drop-off procedures and collaboratively develop compatible technology and traffic management plans.

Pick-up and drop-off procedures that take place on school grounds are often managed by local administrators who determine traffic control elements and oversee staff assisting with pick-up and drop-off, all with the goal of facilitating safe passage for children arriving and leaving by vehicle, or walking and biking. However, the combination of inconsistent infrastructure and procedures represents a complex challenge for ADS.

1 For a comprehensive discussion on the recommendations suggested within this resource, see the PBIC white paper **Considerations for Deploying Automated Driving Systems Around Schools**.

3. ADS developers should work with school transportation stakeholders to identify low-cost solutions that support safe ADS navigation on school property.

Most schools are able to set up their own temporary infrastructure independently according to their own resources. Depending on local funding levels, school administrators may have access to different control elements, ranging from permanent installation of standard devices to improvised materials and procedures. ADS developers need to learn the options that are available for controlling traffic across a range of local laws and budget sizes, as schools vary greatly in the available funds for purchasing and setting up new equipment and infrastructure. Additionally, developers should educate school administrators about the capabilities and limitations of ADS navigation technologies.

4. ADS developers should ensure pedestrian detection systems can accurately recognize children.

The systems designed to assess adult pedestrian movements will not necessarily work for children, and ADS will need to account for small pedestrians whose movements are hard to predict. Children, especially under the age of ten, should not be expected to safely navigate busy roads and crossings on their own and deserve the protection ADS could afford.

5. ADS developers should work with entities who develop training programs for crossing guards to develop and validate procedures for crossing guards.

The arrival of ADS will compound the challenges of crossing guards by requiring them to predict the actions of automated vehicles as well as the intent of human drivers. Crossing guard training varies among school districts, but all will need to prepare crossing guards for both ADS and human drivers.

6. ADS developers should collaborate with traffic safety educators to incorporate ADS deployment topics in future materials intended for children and adults.

Caregivers and educators can play an important role in helping pedestrians stay safe around vehicles driven by ADS. Pedestrian safety education will need to be modified with input from other stakeholders (e.g., transportation professionals, ADS developers) to ensure they are comprehensive.

7. ADS must be able to detect when they enter and exit school zones and comply with posted speed restrictions.

Slowing traffic speeds is one of the biggest challenges in keeping child pedestrians and bicyclists safe. Slower moving vehicles will stop within a shorter distance than faster moving vehicles and, in the event of a collision with a pedestrian, there is a lower likelihood of an injury or fatality. Technology is already available that can inform vehicle automation when it approaches a school zone during arrival or departure times. ADS speeds should be automatically limited in school zones to ensure the safety of pedestrians.

8. ADS should only operate where local roadway infrastructure is sufficient for safe ADS navigation.

The road environment becomes increasingly complex the closer a vehicle gets to a school. ADS will be challenged by the variety of unconventional and often dynamic traffic rules that differ among schools and may not be known to the ADS developers. The detailed mapping and inspections performed by ADS engineering teams should include evaluating school locations during arrival and dismissal.

9. ADS test plans should account for school zones.

ADS developers will need to work with local officials to find a way to strike a balance between maintaining public safety by testing on closed tracks and in simulation and the robust testing that comes with the variability and uncertainty inherent to real-world testing. In the meantime, ADS developers should be safely collecting data in school zones using observational methods to inform future work.

10. Localities should explore the feasibility of temporary street closures for all vehicles during school arrival and dismissal.

The variability and uncertainty of school traffic conditions and infrastructure will undoubtedly challenge ADS, and it may be decided that they are too complex for safe operations. Instead of navigating on school property, ADS could navigate to offsite locations with clear consistent markings that physically separate children from vehicles. Limiting the locations where ADS will be deployed could increase their viability.

Conclusion

The timing of ADS deployment remains a speculative topic, with estimates ranging from imminent to decades away. However, fulfilling most of these recommendations in the near term could still enhance the safety of all schoolchildren. Communities could begin efforts now to improve consistency around school zones and on school campuses to address current challenges resulting from variability among schools. Addressing these issues now would have the immediate benefit of addressing some near-term challenges while laying a foundation to prepare for future ADS deployments.

Pedestrian and Bicycle Information Center

730 Martin Luther King Jr. Blvd., Suite 300 | Chapel Hill, North Carolina 27599-3430

www.pedbikeinfo.org | pbic@pedbikeinfo.org | 888-823-3977

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