Chapter 34
A3PS: Austrian Association for Advanced Propulsion Systems

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34.1 Objectives and Tasks of A3PS

The Austrian automotive industry—or more precisely—automotive supply industry represents a significant value for Austria. Austria exports higher values in automotive parts and components than imports new, complete vehicles. Furthermore, the automotive sector has the highest share of researchers—about 14%. Austria’s universities and research institutions in this field enjoy high international reputation.

In order to maintain this favorable position and to secure Austria’s competitiveness in this field, the industry, research institutions, and the responsible Austrian authorities need to collaborate very closely. The common goal is to support the successful market launch of innovative, advanced vehicle technologies including new energy carriers. Therefore, the bmvit founded the A3PS in 2006 to support an active technology policy of the ministry and to strengthen Austria’s research and development activities.

Since its foundation, A3PS has developed into a well-established strategic public–private partnership (PPP), serving as a reliable partner for the ministry as well as for the partner companies and scientific institutions.

The key priorities in the area of road transport are to support clean, sustainable, affordable, and safe mobility. A3PS helps the officials understand the current technology trends and the R&D requirements of the Austrian stakeholders in this field of expertise. This flow of information provides valuable input for the Austrian technology and funding policy. On the other hand, for the A3PS community, the understanding of Austrian policies are an essential basis for their long-term research planning which provides them with planning security even in technologically risky areas.

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A3PS addresses all advanced drive train and vehicle technologies (e.g., advanced ICE technologies; hybrid-, battery electric-, and fuel cell vehicles; as well as advanced fuel technologies including bio fuels, active safety measures like ADAS) and supports the whole innovation cycle (research, development, deployment).

Objectives and Tasks

- **Cooperation:** Regular joint activities to enable cooperation and common projects for member institutions.
- **Networking:** Stimulating R&D cooperations embedding the Austrian industry and research institutions into new national and international value chains in leading positions.
- **Information:** Strengthening the competence of Austrian enterprises and research institutions by collecting, compiling, and disseminating information on advanced propulsion systems and new energy carriers. Information for the public on the potentials and the state development of advanced propulsion systems.
- **Competence Presentation:** Presenting the Austrian technology competence to national and international conferences and initiatives.
- **Representation of Interests:** Supporting the representation of Austrian interests in international committees and initiatives of the EU and the IEA.
- **Orientation:** Establishing a common view between industry, research institutions, and technology policy by developing a common strategy, roadmaps, and position papers for reinforcing technology development.
- **Advisory function:** Providing fact-based consultancy and recommendations for policy makers to support the optimization of their policy instruments (funding programs, regulations, standards, public procurement, etc.) and to inform the public of the opportunities and perspectives of these new technologies.

### 34.2 ADAS in the Technology Roadmap of A3PS

Requirements on future vehicles will become more demanding than ever before. On one hand, they will need to comply with stringent future emission regulations (e.g., EU6c) under more challenging conditions (WLTP, RDE). On the other hand, it seems to be certain that the European legislature will head for CO₂ emission targets between 68 and 75 g/km in 2025. Additionally, social aspects that are difficult to predict such as changing consumer behavior or new mobility concepts must be taken into account. From the present A3PS members’ point of view, the development and production of future vehicles will be driven by aspects as summarized below:

- Environmental impact
- Efficiency
- Safety (zero fatality)
- Demographic change
- Limited fossil fuels and raw material shortage
Those drivers, in the short and medium term, will cause the development of a variety of alternative vehicle technologies and fuels, which ultimately correspond to the respective application purpose and vehicle class.

Besides energy efficiency and emissions, zero fatality must be a goal of good governance. From today’s perspective, only a combination of passive safety measures and advanced vehicle control systems can achieve this scenario.

Advanced vehicle control systems mainly aim to increase energy efficiency and safety as well as to improve comfort and enable the communication between vehicle and infrastructure. Since human factors causes the majority of all accidents, advanced vehicle control systems have the potential to avoid those accidents and, therefore, save human life. The chart below shows that an accident avoidance of over 50% is possible for a combination of ABS, ESC, lane keeping assist (LKA), predictive brake assist (PBA), automated emergency braking (AEB), driver vigilance monitoring (DVM), speed limiting systems (SLS) and alcohol interlock (AI) (Fig. 34.1).

Experts in automated driving around the globe expect a dramatic reduction of vehicle collisions, accidents, and fatalities in the range of minus 90% once these functionalities are deployed into, e.g., 90% of the vehicles on the road. Assuming that a worst case crash happens at a maximum speed of 10 km/h (around 3 m/s) compared to today’s regulation of Euro NCAP5 [equal to 50 km/h (15 m/s)], the safety concept of all vehicles will have to be redrafted, enabling the application of lightweight structures, reducing the crash buffer, and finally resulting in less energy consumption and better propulsion performance (Fig. 34.2).
Still, the demand for individual road vehicles is growing on a global scale, whereas road infrastructure capacity can neither balance this demand today nor can it be extended in line with the number of vehicles. Therefore, automated vehicles are a key element for an efficient future road transport system.

The A3PS roadmap drafts the path for the radical change from conventional vehicle concepts (SAE automation level 0) to fully automated driving vehicles (SAE automation level 5) in the long term. Actually, huge effort is being expended in academic and industrial R&D, launching numerous research projects and prototype developments. A key issue will be system reliability. When system reliability is granted, these technologies can lead to an “electronic revolution” inside the vehicle.

The A3PS members keep track by monitoring the development in the field of advanced vehicle control systems. Not only because of its relevance to energy efficiency and emission behavior but to push innovation in overall vehicle technologies and to increase the chances for the Austrian industry. This also applies to many companies and institutions in the area of vehicle electronics and software development.1

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1A3PS Technology Roadmap “Eco-Mobility 2025 plus”.