AIM

Application Platform for Intelligent Mobility

AIM

DLR

AIM at a glance

With its Application Platform for Intelligent Mobility (AIM), the German Aerospace Center (DLR) has created a research infrastructure for future intelligent transportation and mobility services. Realization and operation of AIM have received substantial support from the city of Braunschweig, as well as over €15 million in funding from the Helmholtz Association and the state of Lower Saxony from the European Regional Development Fund.

Dieses Projekt wird mit Mitteln des Europäischen Fonds für regionale Entwicklung gefördert.

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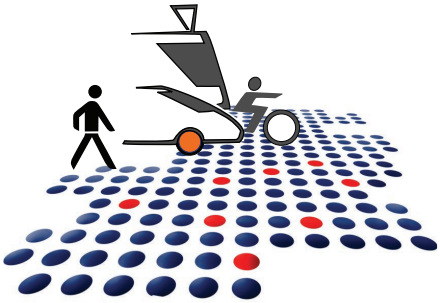
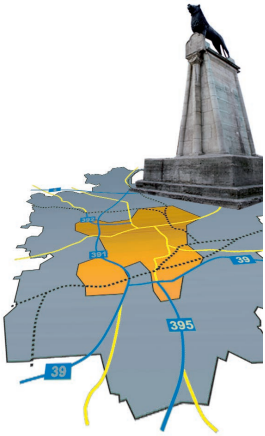
AIM enables DLR scientists and partners to model and systematically study an unprecedented range of topics related to intelligent mobility services, covering both multimodality as well as specific modes of transportation.

The overarching goals are to enhance safety for all traffic participants, to ensure efficient traffic flow, and to protect resources. With these aims in mind, AIM has five major research priorities: traffic flow optimisation, intermodal mobility, future mobility concepts, introduction of new and migration from existing systems, and mobility awareness.

AIM complements the existing large-scale facilities of the DLR Institute of Transportation Systems. These are used to research specific issues relating to automotive and rail systems, and traffic and mobility management. They are linked to AIM on a project basis and can thus help to answer specific and complex questions.





AIM – new dimensions of transportation research

AIM permits the study of highly complex transportation phenomena. How will the use of a combination of different means of transport help improve the transportation of people and goods in future? How can cooperation between transport users contribute to greater efficiency of traffic flows? AIM provides an ideal platform for addressing research questions such as these, opening up new dimensions of transportation research:

Spacial dimension

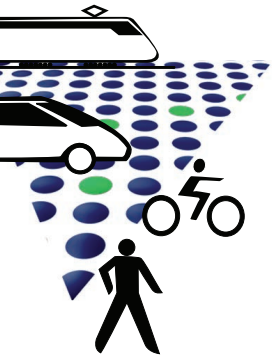
AIM uses the entire city and region of Braunschweig and its transport infrastructure as a research site. With almost a million residents, connections to the motorway and rail networks, and a cluster of excellence for transportation research it is an ideal location for this purpose. For scientists, the AIM research platform provides new opportunities for studying urban mobility issues in a regional context at different levels.

With their mobility behaviour – on their way to school, work or the shops, by car, bus, tram, train or bike – the people of Braunschweig together contribute to a complex traffic situation, helping to advance research in AIM a little every day. AIM is integrated into the traffic management system of the city of Braunschweig, allowing for a seamless progress of research and development from the demonstration of first prototypes up to the testing of products that are ready for the market in a public road space.

Temporal dimension

AIM is unique: whereas other laboratories and test sites are associated with individual projects and limited in time, AIM links research, technology and applications in the long term and in a real-life environment. It provides an open and neutral platform for science and industry, permitting the study of long-term changes in mobility behaviour. In addition, functionality and infrastructure that have been previously tested can be reused in new projects. This considerably accelerates the move from project theory to practical application.

Modularity in design



AIM is probably best described as a modular system with a maximum degree of flexibility.

Combinations of the different AIM modules according to the specific requirements of research projects are possible. For instance, different simulation models can be combined for a study with test subjects, so critical traffic situations – such as at intersections or level crossings – can be taken into account early on in the development of future assistance systems. The modules can also be combined to form a complete workflow process. AIM permits the seamless linking of empirical data surveys and simulation studies, even including the gradual transfer of scientific findings into real-life application.

The individual AIM modules can be reused in follow-up projects, providing more value added, as functions and components already exist and have been tried and tested in operation. It is also possible to build on established partnerships. Official approvals have either already been given or they can be easily acquired.

Thanks to the long-term operation of AIM and the broad range of infrastructure components and vehicle platforms, up-to-date empirical data can always be acquired. Data from different sources can be linked, to yield new findings. And with the long-term availability, it is also possible to identify development trends based on longitudinal studies.

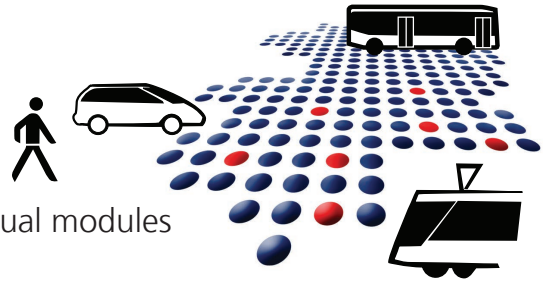
Module portfolio

Vehicle movement data can be collected at the research intersection and research level crossing. With a fleet of specially equipped vehicles, the campaign-specific study of intelligent transport systems and individual driver behaviour is also possible within AIM.

AIM provides a virtual counterpart of the test site on public roads, which can be used in simulator studies. Virtual reference routes provide a framework for the development of new assistance and automation concepts for road and rail transportation. Traffic signals, trees and building data provide a realistic picture for the simulation. This in turn ensures the transferability of research findings from simulation to reality.

The most visible elements of AIM are the system parts for practical tests on the road. An entire road in Braunschweig has been fitted with sophisticated technology for vehicle-to-infrastructure communication. At the „Research Intersection“ multiple sensors (mono and stereo cameras, radar systems) allow the detection, tracking, and classification of motorised and unmotorised traffic participants as well as the prediction of their behaviour in the area of the intersection.

The Institute of Transportation Systems has considerable expert knowledge of data management. AIM ensures the structured analysis of data collected on the road and during simulations. All data, such as those collected at the research intersection, are anonymised and used for research purposes only.



The individual modules at a glance

Simulation:

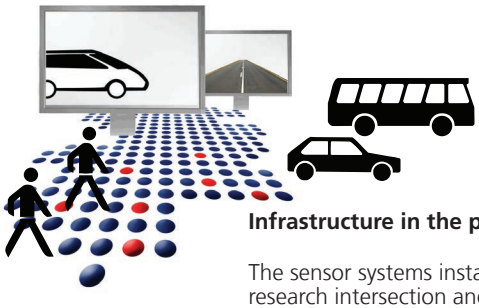
Thanks to virtual reference routes for road and rail traffic, realistic transport infrastructures can be modelled in simulations.

Traffic flow simulations integrate the current traffic situation and permit forecasts of future situations.

Laboratories:

Future vehicle and operating concepts for cars and trams can be set up in a flexible laboratory concept (modular mock-up) and assessed at an early design stage.

A multi-driver simulation provides a platform for testing and evaluating interlinked cooperative assistance and automation systems, which involves multiple test subjects interacting in a driving simulation.



Infrastructure in the public road space:

The sensor systems installed at the research intersection and research level crossing form a comprehensive reference system for new detection algorithms. Based on a set of critical driving situations analysed, innovative assistance systems can be developed and tested, and near misses studied.

To test cooperative assistance systems, DLR operates a complete reference route along Braunschweig's inner city ring and a vehicle fleet.

Data platform:

The data collected on the road and during simulations are made accessible to project partners via data management platforms.

Research for all

The Application Platform for Intelligent Mobility not only supports DLR's own research, it is also available to partners and other interested parties from science and industry. In consultation with DLR, they can rely on DLR's expert knowledge and skills as required for their research projects, as well as on technology modules from AIM. Please contact us for more information.

DLR at a glance

DLR is the national aeronautics and space research centre of the Federal Republic of Germany. Its extensive research and development work in aeronautics, space, energy, transport and security is integrated into national and international cooperative ventures. In addition to its own research, as Germany's space agency, DLR has been given responsibility by the federal government for the planning and implementation of the German space programme. DLR is also the umbrella organisation for the nation's largest project management agency.

DLR has approximately 8000 employees at 16 locations in Germany: Cologne (headquarters), Augsburg, Berlin, Bonn, Braunschweig, Bremen, Goettingen, Hamburg, Juelich, Lampoldshausen, Neustrelitz, Oberpfaffenhofen, Stade, Stuttgart, Trauen, and Weilheim. DLR also has offices in Brussels, Paris, Tokyo and Washington D.C.

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