Pressemitteilung **Press Release**

CRP Repair 4.0 – RWTH Aachen University launches large-scale project – Seven institutes at RWTH Aachen University develop infrastructure for the repair of CRP-based series vehicles

Aachen, August 2015 – The increasing use of fibre-reinforced plastics (FRP) in automotive construction is giving the automotive industry and vehicle workshops the challenge of providing economical repair methods. At RWTH Aachen University and in close cooperation with seven research institutes and around 50 industrial companies, new technologies are being developed for identifying and assessing damage. The project also covers the customised production of repair materials – so-called patches – and the actual carrying out of the repair, including quality assurance.

The background behind this research initiative is that new vehicle concepts are opting increasingly for FRP and especially carbon-reinforced plastics (CRP), because these materials have not only lower weight but also very high stiffness and strength. Advances in the efficiency of the production plants and a reduction in cycle times have resulted in FRP also being increasingly used in the large-volume series production of vehicles. Furthermore, the pressure from legislators to reduce CO2 emissions means that lightweight construction materials such as composites are being deployed in ever more vehicles.

When it comes to repairing FRP parts in ultra-small series, the established method of eliminating the damage is to either replace the entire component or to repair the damage locally on the basis of expert know-how. It has to be said that this is more expensive and more resource-

intensive than repair processes for metal structures. The replacement of large integral structures, such as the CRP body of an electric vehicle, is nowadays impossible at acceptable cost. To ensure customer acceptance, typical repair workshops must be enabled to undertake an inexpensive assessment and repair of the damage.

The project follows the Industry 4.0 principles: All elements involved in the creation of value must be designed so that they can be flexibly adapted to changing requirements and be linked in such a way that they can communicate with each other. Because of the new approach, completely new business models are generated, the development of which will also be examined.

Documentation of the damage is based on the automatic fusion of data on different principles for non-destructive testing. The data are evaluated automatically and instructions are drawn up from this for dealing with the damaged area. For the repair, repair materials in the form of patches, adapted to the particular vehicle and type of damage, are manufactured by means of a system for customised mass production. The patches are subsequently sent to the workshop. The repair is then carried out using newly developed repair and quality assurance processes. Suitable support systems should in future provide the necessary assistance for tasks of this kind.

The institutes taking part in this project are the Institute of Plastics Processing (IKV), the Laboratory for Machine Tools and Productive Engineering (WZL), the Institute of Automotive Engineering (ika), the Institute of Welding and Joining (ISF), the Institute of Metal Forming (IBF), the Institute of Man-Machine Interaction (MMI) and the Research Institute for Industrial Management (FIR) at RWTH Aachen University. Apart from that, around fifty

industrial companies are taking part in a project-accompanying committee. The project is being funded for an initial period of three years by the Confederation of Industrial Research Associations "Otto von Guericke" (AiF) as part of the funding competition "Lead technologies for SMEs".

www.ikv-aachen.de
www.wzl.rwth-aachen.de
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www.isf.rwth-aachen.de
www.mmi.rwth-aachen.de
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About the project consortium:
RWTH Aachen University has an extensive and well-established infrastructure for lightweight production technology. The Laboratory for Machine Tools and Production Engineering (WZL) with the Chair for Production-Integrated Measuring Technology will contribute its extensive know-how on non-destructive testing and will develop the sensor data fusion. The Institute of Automotive Engineering (ika) will research the overall vehicle including its systems and will draw up the automatic damage classification and assessment. The Institute of Plastics Processing (IKV), as one of the largest institutes in the field of plastics technology, will, together with the experts from the Institute of Metal Forming (IBF), develop the materials and processes for the customised mass production of thermoplastic, thermosetting and hybrid repair patches. The Institute of Welding and Joining (ISF) will, with its expertise in adhesives technology, have the task of developing the joining processes. As a proven research institute in the field of e-robotics, the Institute of Man-Machine Interaction (MMI) will transfer these principles to the repair. The development of the business model and the analysis of the new value creation process

will be looked after by the Research Institute for Industrial Management (FIR).

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