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## **Digital, Reliable, Sustainable – Recent Innovations in Fluid Power**

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In times with increasing global awareness for the limited availability of resources and its sustainable usage as well as increasing attention to the impact of humankind on the environment and the global climate, fluid power technology faces new and increasing challenges.

Current research in fluid power is therefore about tackling the current technological changes and socioeconomic challenges. Limiting and dealing with global warming and climate change is the major challenge of the 21st century. It is needed that all industries contribute to this challenge. Therefore, this topic will have a major impact on the development of fluid power technology in the coming years. In addition, digitization, in combination with the reliability of fluid power systems, is opening up new opportunities for innovation at all levels. By presenting selected research papers, this special issue aims to give examples of recent research approaches in fluid power addressing recent challenges towards a sustainable technological development.

We believe that, fundamentally, fluid power technology offers a lot of potential for being a sustainable motion technology. Large forces, high dynamics, long durability and high power-to-weight ratios were and still are the core attributes of fluid power systems. Thus, fluid power has the potential to make a decisive contribution as a motion technology of the future in a sustainable society. To do this, we need to reflect on our strengths and seize the opportunities presented by new trends such as digitalization and collaborative robotics.

Currently, modern fluid power already is strongly positioned with many innovations. Thanks to new system architectures and innovative materials, fluid power systems are more efficient, reliable and environmentally friendly

than ever before. Nevertheless, there is still a lot to do. In the course of IoT and digitization, industry must also address the issue of standardizing interfaces and making more use of available data. Only together and by exchange, modular structures can be created here that can secure and further expand the industry's competitiveness for the future by utilizing new opportunities. In addition, more research needs to be done at material and fluid level for an even higher level of environmentally friendly products and systems with further increased, predictable and monitorable lifetimes.

For mastering the current challenges, we need a close exchange of research and industry, the courage to move away from old ways and the creativity to find new solutions. Because only by means of innovations can we meet the challenges of the future. For giving a platform to dialogue in the fluid power community, the 13th International Fluid Power Conference (IFK) took place in Aachen, Germany from June 13 to June 15, 2022. The following selection of papers has been chosen from more than 100 contributions at that conference. We selected these papers based on scientific quality and relevance of the topic. We look forward to further exchange in March 2024 at the next IFK in Dresden, Germany.

We hope, the presented research gives inspiration to both research and industry to continue our way towards a sustainable future.

Sincerely,  
Katharina Schmitz  
Olivier Reinertz  
Guest Editors