



**AST 2019**

**PROCEEDINGS OF THE  
7<sup>TH</sup> INTERNATIONAL WORKSHOP ON  
AIRCRAFT SYSTEM TECHNOLOGIES  
FEBRUARY 19 – 20, 2019, HAMBURG, GERMANY**

**EDITED BY  
OTTO VON ESTORFF  
FRANK THIELECKE**

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Berichte aus der Luft- und Raumfahrttechnik

**Otto von Estorff,  
Frank Thielecke (eds.)**

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## WELCOME

The Hamburg University of Technology is very pleased to welcome guests from many different countries to the *International Workshop on Aircraft System Technologies AST 2019*. The event takes place every two years and this is the seventh time that we meet. The preparation work has been done and the organizers are very happy to see all of you and spend two interesting days with you here in the city of Hamburg.

In Hamburg industry, universities, and government are working closely together on innovative ideas and developments in the field of future aircrafts. The related R&D activities are embedded in a local network which is strongly supported by *Hamburg Aviation*, an aviation industry cluster for the Hamburg Metropolitan Region.

To strengthen international cooperation, the *Institut National des Sciences Appliquées de Toulouse* (INSA) is again co-organizing the event. The idea to hold the AST and R3ASC (*Recent Advances in Actuation Systems and Components*, Toulouse) conferences on an alternating schedule has been proven to be very successful. The combination of the two events is highly appreciated by many scientists and engineers, who have every year – the AST is organized every odd year while the R3ASC takes place every even year – the opportunity to meet and to exchange on the latest developments in aircraft system technologies.

The 42 contributions presented at the Workshop address latest developments in the fields of *Aircraft Systems and Equipment; Cabin and Comfort; Structures, Design and Production* as well as *Cabin Systems and Avionics*. The proceedings will be a very useful source of information for scientists and practicing engineers working in one of these areas.

It is well known that writing high-level conference papers takes a lot of time and personal energy. As those responsible for the conference, we would like to thank all authors and session organizers for their excellent contributions to the event and for their efforts to make the proceedings such a complete work. We also would like to extend our gratitude to the colleagues of the program committee and the organizing team for their great help and cooperation. Finally, we wish to express our sincere appreciation to the sponsoring and supporting companies, institutions, and associations that made the conference possible.

It was a great pleasure for us to support global research and development in the field of aircraft system technologies through the organization of AST 2019. We sincerely hope that, when looking back, all participants will remember the two days in Hamburg as particularly prosperous and interesting, that they got many useful information, met old and new friends, and also found some time to simply enjoy the ambience of the environment.

Otto von Estorff and Frank Thielecke  
Conference Chairmen AST 2019



## ORGANIZATION

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Prof. Dr.-Ing. Frank Thielecke
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