



EDITOR-IN-CHIEF'S WORD

Continuing the constant support of the presentation of scientific achievements of Croatian scientists, members of our Croatian Academy of Engineering, this issue is dedicated to the presentation of some research work in the field of aviation.

The guest editor of this issue is Prof. Doris Novak, PhD, full professor at the Faculty of Transport and Traffic Sciences, University of Zagreb and head of the Department of Aeronautics, who presents in several articles some results of research projects of the mentioned department.

I believe that every reader will gain new useful insights.

Editor-in-Chief

Vladimir Andročec, President of the Croatian Academy of Engineering



EDITOR'S WORD

Dear readers,

In the context of the global economy, air transport is an important factor in achieving growth and economic development, not only globally but also at regional and national level. In order to meet numerous challenges in providing safe and reliable air transport services in populated areas, air traffic management is constantly being improved by implementing new technologies and developing new practices and monitoring procedures.

To this end, we are glad to present in this issue of Academy's Bulletin Engineering Power a number of research projects conducted at the Department of Aeronautics of the Faculty of Traffic and Transport Sciences

of the University of Zagreb.

Guest-Editor is Doris Novak, associate member of the Academy in the Department of Transport.

Editor

Zdravko Terze, Vice-President of the Croatian Academy of Engineering



FOREWORD

Air traffic has been continuously increasing, giving rise to many challenges, especially in increasing the airspace and sector capacity. By reducing the fragmentation of airspace, an attempt is made to increase the efficiency of the air traffic management system and the provision of air traffic services. This is the core idea of the Single European Sky, a project of modernising European air traffic management system since 2004 in areas of safety, capacity, environment and cost-efficiency. In this regard, one of the major challenges is to reduce flight delays according to pre-planned navigation routes. The concept of free flight or free routes aims to shorten the flight path from departure to destination, which has a positive effect on reducing delays by

shorter flight times. In addition, the fuel consumption during the short flight is less, which has a positive effect on the economy of the flight, but also on the reduction of aircraft emissions in the atmosphere. The workload of an air traffic controller has also an impact on the airspace capacity in which it is necessary to provide greater flow of aircraft to reduce delays. With appropriate design of training syllabus, and with acquisition of practical skills in provision of air traffic control service, it is possible to directly increase the capacity of a given airspace and reduce aircraft fuel consumption. In addition, it is possible to predict or calculate under conditions when unexpected storm clouds occur in the atmosphere, which require aircraft to safely avoid them. Finally, automated systems in air traffic management that use artificial intelligence in prediction tools should assist air traffic controllers to have good situational awareness of aircraft position and other data that may adversely affect flight safety. All these concepts are being developed within the framework of research projects at the Department of Aeronautics of the Faculty of Traffic and Transport Sciences at the University of Zagreb in cooperation with other partner universities and European air navigation service providers. We hope that by reviewing our research below we will stimulate interest in the field of air traffic management and in our research.

Guest-Editor

Doris Novak, University of Zagreb, Faculty of Traffic and Transport Sciences