



University textbook

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## ZRAKOPLOVNA PROSTORNA NAVIGACIJA AREA NAVIGATION

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The university textbook *Area Navigation* by Doris Novak presents the concepts of airspace design and air traffic and explains in detail the methods of area navigation and its application. The implementation of the method is reflected in the design of instrumental flight procedures that determine the flight procedures under the flight conditions without visibility, as well as in aircraft navigation systems. The method of area navigation is based primarily on satellite navigation, thus principally differing from the methods of radio-navigation based on the ground based radio-navigation aids. There is a systemic presentation of the evolution of the navigation specifications used today in area navigation. The area navigation is part of the new concept of air traffic (ICAO PBN concept and CNS/ATM system). In this part the author draws parallels with the method of radio-navigation in order to explain the advantages provided by area navigation.

The University textbook is an original work regarding the method of dealing with the subject matter. The topics covered in the textbook are very useful for the students, since there are no similar works that deal with the topic of aviation area navigation. The work is methodically adapted to the study course of aeronautics. The concept and the method of area navigation are studied in detail, and the instrumental flight procedures, the system for flight management and navigation as well as the processes of forming the flow of the aeronautical information and databases on which the flight control system operation is based.

The textbook is written for the levels of undergraduate and graduate study of aeronautics. It follows the syllabus of the course "Air Navigation II" taught at the undergraduate study of aeronautics at the Faculty of

Traffic and Transport Sciences in Zagreb. Some of the chapters can be used also in the subject "Avionics and IFR Flying" at the graduate study of aeronautics.

The first chapter elaborates the concepts of visual and instrumental navigation. Chapter 2 studies area navigation and presents the evolution of navigation specifications that are used today in area navigation. Chapter 3 explains in detail the navigation infrastructure and single specifications, as well as air navigation errors. Comparisons are made with the method of radio-navigation in order to explain the advantages provided by area navigation. Chapter 4 explains the operation principles of the satellite navigation system and their limitations. The explanation is given also about the GNSS augmentation systems which significantly contribute to the improvement of system performances. Chapter 5 analyses instrumental flying procedures with special emphasis on the instrumental approach procedures. The approach procedures with ILS system are systematised and studied but also with the implementation of the area navigation method, with the explanation of the characteristics that determine them and the possibility of clear definition of advantages of implementing the area navigation method. Chapter 6 describes the system for flight management and guidance as well as the functions that can be realized by its implementation within the frame of the area navigation method. Chapter 7 explains the formation and distribution of aeronautical information and databases on which the flight control system operation is based.

The textbook *Area Navigation* presents the concepts airspace design and air traffic and in this context it explains the area navigation method. The theoretical and practical approach in the analysis of area navigation methods presented in this textbook can be of great use in solving the navigational problems and tasks. The navigation infrastructure and certain specifications, as well as navigational errors in aircraft guidance have been explained in detail. The approach procedures using the area navigation method have been systematized and elaborated with the explanation of the characteristics that determine them. Furthermore, the process of forming aeronautical information which is the basis for the flight control system operation has been explained. The textbook presents the standards of databases which define the processes of generating and processing of aeronautical data that represent the backbone of the implementation of the area navigation method in air traffic. It is especially important to emphasise that the approach in studying the material of the textbook *Dead Reckoning Navigation* was primarily based on the scientific knowledge, as well as the practical flying experience of the author.

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