Chapter 13
Critical Aviation Information Systems: Identification and Protection

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EXECUTIVE SUMMARY

This chapter is devoted to developing formalization methods for identification and security objects of critical information infrastructure (CII) in civil aviation. The analysis of modern approaches to the CII identification was carried out that gave a possibility to determine weaknesses and to formalize a scientific researches task. As a result, the unified data model was developed for formalizing the process of a list of CII objects forming in certain field and at the state level. Moreover, the specialized technique was developed. Besides, the identification method was proposed, and it gives a possibility to determine elements of CII field, mutual influences, and influence on functional operations of critical aviation information system. Furthermore, special software was developed and implemented that can be useful for CII elements

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identification and also for determining its influences on functional operations. Also, the basic aspects of cybersecurity ensuring for identified critical aviation information system were described in this chapter.

INTRODUCTION

Present-day trends in information and communication technologies (ICT) have caused phenomenal dependence the society form services which different infrastructure proposed. For now, quality and accessibility of these services are the main points of infrastructure development of the state. According to that, the ensuring their protection and stability are the most essential and mandatory part of State security in developed countries. Increased concentration of facilities and resources for protection the different types of electronic infrastructure had necessitated ranking of infrastructure objects, choosing the most important of them and creating the "critical infrastructure" (CI) definition. Typically, this category relates to energy and transmission line, oil and gas line, seaports, high-speed and government communications channels, life-saving systems of megacities, high-tech enterprises and enterprises of the military-industrial complex, and also the central government authority. The civil aviation (CA), given the need to ensure sustained communication and cooperation between ground-based and aircraft systems, are required special attention. Therefore, identifying the objects which are critical for ensuring the system information continuing operation is the first priority. Nevertheless, an unlimited number of objects and system parameters that constantly varied and unforeseen behavior of objects with lots of interlinkages are the main reason for difficulties with the identified objects of state critical infrastructure. The basic component of critical infrastructure is an informational part – so-called CII (critical information infrastructure). The main reasons for the CII importance are the widespread usage in all areas of human activity of ICT, dependence on them of citizens, society and the state, as well as increasing vulnerabilities and potential threats of different nature. Moreover, in some countries a strong focus on the CI importance for the nation (even the CII definition is critical national information infrastructure). In case of Ukraine, the legislative framework for regulating the protection of CI still in an early development stage, particularly, continuing the process of identifying the objects of state CI in different fields (with no great success, unfortunately). The problematic of CII protection (CIIP) in various fields was exploring by the Ukrainian and foreign scientists such as: H. Alcaraz, D. Biryukov, D. Bobro, D. Gritsalis, O. Dovgan, E. Yeliseyev, A. Kondratiev, M. Merabti, L. Romano, H. Sitarlis, I. Fovino, V. Kharchenko and others. However, the most of researches are not systemic: 1) mostly researches oriented on development and implement preventive and countermeasures for protection particular CI or CII objects; 2) not enough focus making on the mechanism of formulating the list of state CII, and known approaches (according to the international standards and recommended practices), which are not formalized that make it difficult to use them on the state level, especially in CA. According to that, a development the unified data model and the methods of identifying the objects of CII is the actual scientific task that has theoretical and practical values.

State of the Art in CIIP

Modern society totally depends on ICT, the dysfunction and breakdown of which may lead to chaos, significant financial losses and even mass deaths of people.