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METHODS AND TOOLS FOR OPERATIONAL PSYCHODIAGNOSTICS FOR IDENTIFYING AND PREVENTING ACTS OF UNLAWFUL INTERFERENCE IN CIVIL AVIATION ACTIVITIES

Abstract

Methods and means of operational psychodiagnostics have been developed to detect and prevent acts of unlawful interference in the activities of civil aviation. Various profiling methods are analyzed and systematized depending on the specifics of the operation of transport complexes. It has been established that the most important professional quality of an inspector is the development of control. Together with the science that studies the sound codes of non-verbal communication - paralinguistics, kinesics is included in the central area of non-verbal semiotics - the science that studies non-verbal sign systems. The most convincing evidence of the superiority of non-verbal language over verbal is the results of the international characteristics of the main facial expressions, postures, gestures, as well as data on the features of gestures and facial expressions. human genetic features, such as innate ways of expressing emotions. This information is useful and important. The concept of observation and assessment of personality by external signs (operational psychodiagnostics) is given. Various options for using technologies based on artificial intelligence, including speech signal analysis, are discussed. It has been established that the use of profiling is useful and important for detecting and preventing acts of unlawful interference in the civil aviation service. Particular attention is paid to the results of this study, which involves the use of a device designed for digital processing of speech signals to identify and analyze the information necessary to assess the psycho-emotional state based on artificial intelligence.

Keywords: aviation profiling, emotion recognition, speech signal, neural network, inspector-profiler.

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МЕТОДЫ И ИНСТРУМЕНТЫ ОПЕРАТИВНОЙ ПСИХОДИАГНОСТИКИ ДЛЯ ВЫЯВЛЕНИЯ И ПРЕДОТВРАЩЕНИЯ АКТОВ НЕЗАКОННОГО ВМЕШАТЕЛЬСТВА В ДЕЯТЕЛЬНОСТЬ ГРАЖДАНСКОЙ АВИАЦИИ

Аннотация

Разработаны методы и средства оперативной психодиагностики для выявления и предупреждения актов незаконного вмешательства в деятельность гражданской авиации. Проанализированы и систематизированы различные методы профилирования в зависимости от специфики эксплуатации транспортных комплексов. Установлено, что важнейшим профессиональным качеством инспектора является развитость контроля. Вместе с наукой, изучающей звуковые коды невербальной коммуникации – паралингвистикой, кинесика входит в центральную область невербальной семиотики – науки, занимающейся изучением невербальных знаковых систем. Наиболее убедительным свидетельством превосходства невербального языка над вербальным являются результаты интернациональной

характеристики основных выражений лица, поз, жестов, а также данные об особенностях жестов и мимики. генетические особенности человека, такие как врожденные способы выражения эмоций. Эти данные полезны и важны. Дано понятие наблюдения и оценки личности по внешним признакам (оперативная психодиагностика). Обсуждаются различные варианты использования технологий на основе искусственного интеллекта, в том числе анализа речевого сигнала. Установлено, что использование профайлинга полезно и важно для выявления и предотвращения актов незаконного вмешательства в службу гражданской авиации. Особое внимание уделено результатам данного исследования, предполагающего использование устройства, предназначенного для цифровой обработки речевых сигналов, для выявления и анализа информации, необходимой для оценки психоэмоционального состояния на основе искусственного интеллекта.

Ключевые слова: авиационный профайлинг, распознавание эмоций, речевой сигнал, нейронная сеть, инспектор-профайлер.

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АЗАМАТТЫҚ АВИАЦИЯНЫҢ ҚЫЗМЕТІНЕ ЗАҢСЫЗ АРАЛАСУ ӘРЕКЕТТЕРІН АНЫҚТАУ ЖӘНЕ АЛДЫН АЛУ ҮШІН ЖЕДЕЛ ПСИХОДИАГНОСТИКА ӘДІСТЕРІ МЕН ҚҰРАЛДАРЫ

Аңдатпа

Азаматтық авиация қызметіне заңсыз араласу актілерін анықтау және алдын алу үшін жедел психодиагностиканың әдістері мен құралдары әзірленді. Көлік кешендерінің жұмыс істеу ерекшеліктеріне байланысты әртүрлі профильдеу әдістері талданады және жүйеленеді. Инспектордың ең маңызды кәсіби сапасы бақылауды дамыту екені анықталды. Вербалды емес коммуникацияның дыбыстық кодтарын зерттейтін ғылым – паралингвистикамен бірге кинесика вербалды емес семиотиканың орталық саласына – бейвербалды белгілер жүйесін зерттейтін ғылым кіреді. Бейвербалды тілдің вербалға қарағанда артықшылығының ең сенімді дәлелі - негізгі мимика, поза, ым-ишараның халықаралық сипаттамаларының нәтижелері, сондай-ақ ым-ишара мен мимика ерекшеліктері туралы деректер. эмоцияны білдірудің туа біткен тәсілдері сияқты адамның генетикалық ерекшеліктері. Бұл ақпарат пайдалы және маңызды. Тұлғаны сыртқы белгілер бойынша бақылау және бағалау (операциялық психодиагностика) түсінігі берілген. Жасанды интеллект негізіндегі технологияларды қолданудың әртүрлі нұсқалары, соның ішінде сөйлеу сигналын талдауы талқыланады. Азаматтық авиация қызметіне заңсыз араласу актілерін анықтау және алдын алу үшін профильді қолдану пайдалы және маңызды екені анықталды. Жасанды интеллект негізінде психоэмоционалды жағдайды бағалауға қажетті ақпаратты анықтау және талдау үшін сөйлеу сигналдарын цифрлық өңдеуге арналған құрылғыны пайдалануды көздейтін осы зерттеудің нәтижелеріне ерекше назар аударылады.

Түйін сөздер: авиациялық профайлинг, эмоцияны тану, сөйлеу сигналы, нейрондық желі, профильші инспекторы.

Introduction

The experience of recent decades has shown that the traditional focus on standard control procedures in law enforcement agencies and aviation security services using only screening equipment is a necessary but not sufficient condition for preventing unlawful interference in aviation activities.

Methods, means, methods for detecting the prevention of acts of unlawful interference in activities are mainly aimed at identifying prohibited items and substances, as well as forging documents. At the same time, screening technology does not allow detecting the unlawful intent of a potentially dangerous passenger.

The intent may have a purpose and motive not directly related to terrorism. Consequently, the actions of a potentially dangerous passenger may be of a criminal nature, and aggressive behavior or actions that lead to a violation of public order in the controlled areas of the airport depend on the psychophysiological characteristics of the person, his political and religious views, temporary economic difficulties, etc.

The concept of profiling is based on the postulate that every passenger can be a terrorist or a "destructive" passenger, and every object can be an explosive device, an attack weapon or a weapon.

The insufficient theoretical development of the problem, as well as the high practical significance of identifying potentially dangerous passengers by aviation security officers at civil aviation facilities, determined the choice of the topic and determined the idea of the study.

Research Methodology

In the practice of bodies specializing in operational-search service and investigation, profiling technology (the term comes from the English word profile - "profile") is understood as a system for assessing a person and identifying his features, using methods of non-verbal and operational psychodiagnostics. The use of this technology in the work of aviation security personnel is designed to solve a number of critical tasks related to flight safety.

Profiling is a tool for operational psychodiagnostics, which directly helps to create a complex psychological portrait of a person in order to predict and predict his behavior in a given situation.

Modern methods of profiling technology set themselves the task of identifying or refuting illegal intentions and threats during screening at airports before departure by analyzing the psychophysiological reactions of passengers, in other words, identifying possibly dangerous people with destructive (negative) behavior in order to isolate them from other passengers, with further transfer of these persons and their data to law enforcement and security services for operational work [1].

Since the 70s of the 20th century, the Israeli profiling service has been operating in the El Al airline, which is considered the most effective profiling service (Figure 1). Organization of airport security. Ben Gurion is conducted according to the principle of several circles of protection. The outer circle performs the work of special services, that is, to obtain information about possible terrorist attacks and prevent the threat on their own. The perimeter of the main protection circle is a protected area. The airport security service is part of the inner circle of protection, no one can enter this circle without official permission. There is no general screening at the airport. On the way to the terminal, the passenger is under the supervision of more than ten profilers, conversations are being held, and if necessary, an examination is carried out.

Figure 1. Israeli airline El Al (downloaded from https://ppt-online.org/ (Accessed 09/28/2022))

In the US Transportation Security Administration, employees use a behavioral detection program, program purpose, outdoor, covert surveillance, and passenger behavior inference. Today, the administration confirms the work of 3 thousand employees, these employees are engaged in behavioral detection at 161 of 450 US passenger airports.

In Russia, the first airport to use profiling technology is Domodedovo Airport. Further, these technologies began to be applied at the airports of Sheremetyevo, Pulkovo, Adler, Koltsov and other major airports in Russia [2].

The profiler's job is to constantly monitor the flow of passengers, also to analyze the maximum possible number of people in the minimum amount of time, to reduce the threat, this whole procedure reduces the risk of a terrorist getting into the flow of passengers, but unfortunately this risk will never be equal to zero. Profilers do not always have the opportunity to watch, have a conversation, ask specific questions to absolutely everyone, since the passenger flow is huge.

In this regard, "visual profiling" is the main stage of the profiler's work, with the help of visual profiling, a specialist can draw a conclusion based on the appearance and behavior of a person. That is, the passenger traffic is divided into two categories - "potentially dangerous" or "potentially safe" [3].

The technologies of our time are aimed at protecting society from persons who are potentially dangerous, capable of causing damage on a different scale. Profiling (from the English profile - profile) has become one of these technologies, using techniques that can identify people with potentially dangerous behavior.

The first task of the inspector - profiler in the work of collecting information is to assess the personality by observing external signs (operational psychodiagnostics), in order to identify passengers who may pose a danger to the lives of civilians.

The main task of profiling (from the English profile - profile) is the operational analysis of the psychological behavior of people. With the help of analysis, the profiler can quickly classify a person, predict his behavior, and identify basic behavioral strategies. All this psychodiagnostics is designed for lie detection without any tools (Figure 2).

Figure 2. Instrumentless lie detection (downloaded from https://guardinfo.online/ (Accessed 09/28/2022))

The main task of developing and implementing profiling technology is to determine and understand what behavioral strategies distinguish a person who is trying to hide the truth. One of the most difficult aspects in the work of a profiler is the rapid identification and analysis of the psychological characteristics of a person [4].

For a qualitative and effective solution of the task, in a short period of time it is necessary to identify a way of interacting with the subject, and then choose the most effective strategy of behavior. It is necessary, having adjusted to the individual characteristics of the subject, to arrange him for yourself, thereby motivating him to be sincere in communication. The ability to obtain a psychological portrait of the subject allows you to analyze his behavior in general and end the whole process without conflict.

For the competent and high-quality implementation of all these actions, the profiler must have the appropriate knowledge and skills. The task is complicated by the fact that there is always little time for personality assessment [5].

Profiling technology [6] is based on non-test character recognition with behavior control, which makes it possible to obtain a holistic objective idea of the psychological potential of the observed subject by individual fragments of behavior.

The basis of the methodology is a clinical or phenomenological way of describing the forms and results of people's behavior. This method of examination was formed in psychiatric practice. It was noted that various behavioral phenomena, assessed by psychiatrists as symptoms (signs) of mental illness, are partly observed in healthy people - adequate, socially successful.

Compared with painful manifestations, which are, as it were, "blurred", in healthy people they do not reach a marginal degree of severity. In general, in essence, the phenomena of the behavior of patients are not identical, but similar. A large amount of data has been collected on the characteristics of social behavior, as part of a clinical approach.

An idea has been formed about various behavioral tendencies - stable, defined in their essence, using characteristic psychological tools and pursuing specific goals.

In the depths of any crime, there are two reasons: the first is the personality of the criminal, which is woven from the characteristics of his mental constitution, the second consists of factors external to this personality, under the influence of which a person falls into a criminal path. But not a single crime can be explained solely by external causes, ignoring the characteristics of the personality psychotype.

Now various methods of assessing the typology of people are becoming more relevant. Thus, such terms as "type of behavior" or "type of character" appeared, which describe a set of actions united by one pronounced general trend, based on this, in order to be able to describe large trends, the term "typologies of characters" was introduced. The principle of any typology or classification is as follows: if a person exhibits any character trait characteristic of other people with similar traits, then he belongs to the group corresponding to this type of character.

Research results

Based on the teachings of psychologists about the properties of character, the technique of "7 radicals" by Viktor Ponomarenko was developed - based on non-test character recognition with behavior control, which allows for individual fragments of behavior to obtain a holistic objective idea of the psychological potential of the observed subject.

The author of the "7 Radicals" methodology is a Russian scientist, psychiatrist, expert psychologist of the special services of the Russian Federation, researcher in the field of individual and social psychology Viktor Viktorovich Ponomarenko. The methodology of "7 Radicals" is based on the so-called clinical or otherwise phenomenological approach to describing the forms and results of human behavior. This approach originated and developed in psychiatric practice. It was noted that various behavioral phenomena, assessed by psychiatrists as symptoms (signs) of mental illness, are partly observed in healthy people - adequate, socially successful.

Of course, in healthy people they do not reach a marginal degree of severity, they are, as it were, "blurred" in comparison with painful manifestations. And in its essence, the phenomena of behavior of sick and healthy people are not identical, but similar. As part of the clinical approach, a lot of data has been accumulated on the characteristics of social behavior.

An idea has been formed about various behavioral tendencies - stable, defined in their essence, using characteristic psychological tools and pursuing specific goals.

The basic concept of the methodology is "radical" (a word derived from Latin radix - root). A radical is a structural and functional element of an individual's character, a stable set of traits (qualities of behavior) that have the same origin (homogeneous, single-rooted). The author of the methodology proceeds from the generally accepted and scientifically substantiated idea that certain behavioral phenomena (phenomena) are based on innate characteristics of temperament and intelligence.

According to him, radicals denote enhanced character traits and characteristics of an individual, due to which a person begins to use the same "patterns" of behavior in different situations.

The presence of leading radicals in a person can be determined by the following criteria:

- Appearance (body build, clothing, accessories and jewelry, facial expressions, gestures, gait, facial features);
- observable features of behavior (habits, patterns and main features);
– space design (home, office, car, desk and even screens of smartphones and computers).

As a rule, 1-2 radicals are pronounced in each person, while the rest are "mixed" in different proportions. This forms a kind of cocktail of qualities that makes people different from each other. The presence of leading radicals makes it possible to predict human behavior on the basis of those character traits that are inherent in a particular radical. Having understood which radicals are leading, you can understand much more:

- styles of behavior in crisis situations;
- hidden character traits;
- Patterns and patterns of behavior.

In conditions of lack of time for the rapid collection of information, this technique is perfect. Using the technique, you can avoid testing and establish contact as quickly as possible by recognizing the typology of a person. This technology has found its application in various areas of work with people, especially the special services, with which the author worked closely, fell in love with it.

The main operational task of the profiler is to determine the leading psychotype of a person in the first minutes, which becomes possible when using this technique.

In addition, one of the equally important tools of profiling technology is physiognomy. "Physiognomy" is a system of knowledge that allows you to quickly draw conclusions about the emotional manifestations of a person in appearance. This is a science that studies the features and expressions of the face, due to the physiological structure, in order to determine the type of personality, character of a person and the characteristics of his health. It originated in ancient times, and in each culture it was given its own meaning. For example, in the East it was believed that a person's whole life path can be seen on a person's face, and physiognomy was equated there with a

full-fledged section of medicine. Consider what can be said about a person by the features of his face. Specialists studying physiognomy can easily put forward proposals about the type of personality and character of a person according to special features. They divide the face into zones that carry certain information. In doing so, attention is paid to:

- bright and special features of the face, which are indicators of the main specific character;
− protruding parts indicating human capabilities;
- symmetries and asymmetries, which indicate individual characteristics.

To date, it has been proven that the entire spectrum of a person's emotional state can reflect the face. Studies have established universal individual and emotional expressions. They are based on six systems of facial reactions, specifically reflecting surprise, fear, indignation, disgust, joy and sadness.

As a rule, the assimilation of the features of the manifestation of universal expression makes it possible to learn to recognize the emotional subtext of the actions of the person being studied.

In the work of the profiler Kinesics is a necessary tool for operational diagnostics of identifying potentially dangerous persons, which allows you to comprehensively analyze a person's non-verbal behavior: gait, facial expressions, hand and body movements.

There is also the phrase "body language", which contains symbolic fragments of movements of various parts of the body and postures, with the help of which, just like with the help of words, people's thoughts are structured, formed and encoded, as well as their feelings, and emotions are betrayed. and ideas. Unsigned movements can also be attributed to body language, for example, postures, gait, foot and head gestures, facial gestures, etc. It is known that facial expressions, gestures as elements of a person's non-verbal behavior are one of the first visual, sign systems acquired in ontogeny. The most compelling argument in favor of the priority of non-verbal language over verbal is the results that testify to the international nature of the main facial expressions, postures, sets of gestures, as well as data on the features of gestures and facial expressions that are genetic features of a person, for example, innate ways of expressing emotions. Spontaneous non-verbal behavior is gradually supplemented by symbolic facial expressions, gestures, intonations, postures, the use of which is based on cultural, group, situational agreement and is impossible without prior training.

Thus, a variety of body languages \u200b\u200bhas appeared. There are several main ones:

Body language that exists and interacts with verbal language in the process of communication;
− The language of pantomime;
− Sign languages that do not correspond to speech, created by people with hearing impairments;
− ritual sign languages;
− Professional sign languages and dialects;
− Gesture pictorial language subsystems of cinema and theater;
− Dance languages.

Together with the science that studies the sound codes of non-verbal communication - paralinguistics, kinesics is included in the central area of non-verbal semiotics - a science that studies non-verbal sign systems. People perceive and decipher body language on a subconscious level, and, as a rule, this language is beyond the control of the person who speaks it. It is no secret that non-verbal communication is the most effective way to convey information, and non-verbal signs quite accurately determine the behavioral constructs of a person. Non-verbal behavior itself is defined, first of all, as an emotional channel for transmitting information [7].

The technique "Psychological portrait" is a set of activity-significant, characterological, typological features and personality traits.

Table 1 shows the types of behavior orientation according to K. Horney.

Table 1 – Types of behavior orientation according to K. Horney

Features	"To people"	"From people"	"Against the People"
Gait	Fast, smooth, rhythmic.	Fast and short steps, frequent stops.	Fast, angular. The steps are long. Does not pay attention to obstacles, touches things.

Pose	Hands are not clasped, lie freely on some surface. The body is slightly tilted forward, towards the interlocutor. The head is often tilted to one side. The feet are directed towards the interlocutor, close to each other.	Hands close to the body, pressed to the body, clasped or crossed at chest level. The legs are one in front of the other or one on top of the other, the feet are directed towards the interlocutor. Sits on the edge of the seat. Holds sideways to the interlocutor. He often holds some objects in his hands, clutches a bag or folder to himself.	Hands far from the body, high (at face level), not connected to each other, palms often clenched into fists. Legs are widely spaced. Sits on the entire seating area, leaning back. It is located close to the interlocutor, turning to him with his whole body.
Gestures	Often nods his head, touches the interlocutor, strokes him with his hands.	During the conversation, he often scratches different parts of his body or face, twists small objects in his hands.	Often swings his arms, swings his whole body, taps on surrounding objects, grabs the interlocutor by the clothes, pats on the shoulder.
Facial expressions	Often smiles.	Often raises eyebrows, horizontal wrinkles form on the forehead. The mouth is slightly open.	Often reduces eyebrows, frowns, vertical wrinkles form on the forehead. Tightly clenching jaws, baring teeth.
Sight	Looks at the interlocutor directly or slightly sideways.	He tries not to look directly at the interlocutor, often averts his eyes to the side.	Looks straight at the interlocutor, often frowningly.
Speech	The voice is loud, speaks calmly, smoothly and without pauses, listens attentively.	The voice is quiet, sometimes trembling. The speech is not very coherent, there are many pauses. Laconic.	Loud voice, sometimes breaking. He speaks a lot, quickly, almost without pauses, often does not listen to his interlocutor, interrupts.
Language	Often uses the pronouns "I" and "We", asks a lot of questions, uses a lot of interjections and exclamations.	The expressions "I must", "I need", "I can't", "I can't", "shouldn't" are often used. Many words of parasites (well, in general, it means).	There are many pronouns "you", evaluative adjectives and verbs in the imperative mood ("you must", "you need", "let's").
Clothes	Modern, relevant to the situation.	Dressed neatly, a lot of clothes, buttoned tightly.	Careless, wide open.
Behavior style	Often pretends to be naughty, laughs, jokes.	Often justifies, defends, clarifies, hesitates.	Demands and criticizes a lot, often shouts, insults, threatens, refuses to fulfill the requirements.

Using the above methods, you can quickly draw up a "psychological portrait" of the alleged offender. "Psychological portrait" is a set of activity-significant, characterological, typological features and personality traits. A psychological portrait contains, as a rule, two main sections: a general part (a statement of the leading tendency of the character and the conditions for its manifestation) and a special part (answers to specific applied questions posed to psychological research) [8-9].

If the profiler does not have enough information collected to assess threats, then the second step in its work is a standard survey conversation. The profiler does not need to evaluate a person or his

actions from a "bad-good" position. He simply observes and draws his conclusions, without value judgments. He identifies and analyzes both strong, screaming "inconsistencies" and signals, as well as weak and imperceptible signals, inconsistency and "unevenness" of the psychological texture of behavior (verbal and non-verbal): not only details are important, but also the method and order of human actions. The profiler analyzes, compares the facts and compiles his psychological portrait, "performs prospection and, if necessary, retrospection. Of course, the liar is aware that he is lying, and tries to control these very external manifestations. But, having caught even slight deviations from typical behavior, the profiler will ask additional questions, read the candidate's emotions, and this will help him find out the reasons for the change in the behavior of the interlocutor.Special observation allows the profiler to correctly interpret the information received.For a more accurate assessment, the profiler comes to the aid of instrumental diagnostics, during which it is recommended to use the digital speech processing apparatus developed by the authors signal, to identify and analyze informative features necessary for assessing the psycho-emotional state based on artificial intelligence.

Discussion (Discussion of results)

In the course of studying modern advanced international experience in the use of profiling technology, the authors analyzed and systematized various methods of operational psychodiagnostics in relation to the specifics of the operation of transport complex facilities. The authors emphasized the development of observation as the most important professional quality of an inspector-profiler. The authors came to the conclusion and identified a number of basic methods recommended for use by profilers at the airports of the Republic of Kazakhstan.

Conclusion

Thus, as a result of the task of analyzing the best practices of using profiling technology at the world's leading airports, the following effective and promising methods were identified and established [10]:
- "7 Radicals" is based on non-test character recognition with behavior control, which allows for individual fragments of behavior to obtain a holistic objective idea of the psychological potential of the observed subject;
- "Physiognomy" - a system of knowledge that allows you to quickly draw conclusions about the emotional manifestations of a person in appearance.
- "Kinesics" allows you to comprehensively analyze the non-verbal behavior of a person: gait, facial expressions, movement of hands and body.
The above methods form a psychological portrait according to activity-significant, characterological, typological features and personality traits.
The technological solutions determined as a result of the research should be applied in the Republic of Kazakhstan, while the main emphasis should be placed on the use of technologies based on artificial intelligence, including the analysis of a speech signal.
As a result of the research, the relevance and scientific novelty were confirmed.

Список использованной литературы:

Refereces:

1 Abramov V.N., Berjozkin A.M., Stepanenko Ju.V. O merah po obespecheniju bezopasnosti lic, nahodjashhihsja na bortu vozdushnogo sudna vo vremja poleta // Sovremennyj jurist. 2013. № 4 (5). S. 8-22.

2 Aminov I.I., Jeriashvili N.D., Volynskij-Basmanov Ju.M., Volynskij V.Ju., Kameneva M.E.Profajling. Tehnologii predotvrashhenija protivopravnyh dejstvij. 2-e izdanie. M.: Izd.- Juniti-Dana, Zakon i pravo, 2012.

3 Bezopasnost' na transporte: Uchebno-metodicheskoe posobie: Ju.B. Mihajlov, Ju.M. Volynskij - Basmanov; pod red. V.B. Chertoka. -M.: NUC «Abinteh», 2014. - 584 s.

4 Eremina T.I. Vizual'naja psihodiagnostika. Jekspress-metody identifikacii lichnosti po vneshnosti, mimike i zhestam. Uchebnoe posobie. Rostov-na-Donu. 2012.

5 Kameneva M.E., Nazarov O.V. Psihologicheskaja model' vyjavlenija potencial'no opasnyh lic na ob‡ektah grazhdanskoj aviacii // Transportnaja bezopasnost' i tehnologii № 2 (37) 2014 g. - s. 174-177.

6 V.V. Ponomarenko. Prakticheskaja harakterologija. Metodika 7 radikalov // ISBN: 978-5-17-116268-9, Izdatel'stvo: AST, 2019 g. S. 224.

7 Profajling. Tehnologii predotvrashhenija protivopravnyh dejstvij: uchebnoe posobie dlja studentov vuzov, obuchajushhihsja po special'nostjam «Jurisprudencija» i «Pravoohranitel'naja dejatel'nost'» / N.D. Jeriashvili, E. Kameneva, Ju. Volynskij-Basmanov i dr.; pod red. N.D. Jeriashvili, E. Kamenevoj. - 4-e izd., pererab. i dop.: JuNITI-DANA: Zakon i pravo, 2016. - 1 s.: il., shem. - Bibliogr. v kn. - ISBN 978-5-238-02662-6; [Jelektronnyj resurs]. - URL: //biblioclub.ru/index.php?page=book&id=446430 (14.04.2022).

8 Profajling v dejatel'nosti organov vnutrennih del. Uchebnoe posobie. Pod red. V.L. Cvetkova. – M.: JuNITI-DANA, 2014.

9 Chelovek i bezopasnost' poletov: Nauchno-prakticheskie aspekty snizhenija aviacionnoj avarijnosti po prichine chelovecheskogo faktora: sbornik nauchnyh trudov / pod red. V. A. Ponomarenko, A. V. Chuntula. Jelektron. dan. - Moskva, 2, 2013. - 287 s. – Rezhim dostupa: https://e.lanbook.com/book/109313

10 K.T. Koshekov, A.A. Savostin, B.K. Seidakhmetov, R.K. Anayatova, I.O. Fedorov. Aviation profiling method based on deep learning technology for emotion recognition by speech signal // Transport and Telecommunication, 2021, volume 22, no. 4, P.383-393. https://doi.org/10.2478/ttj-2021-0037