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MULTIMEDIA EVALUATION SYSTEM OF PSYCHOLOGICAL QUALITIES OF AVIATION PERSONNEL. MULTIMEDIA MODULE

The purpose *is to increase the level of safety of aviation personnel by developing a multimedia system for evaluating mental and physical qualities of aviation personnel. In the process, there was considered a place of software in testing psychological qualities of human, considered types of multimedia systems, which are used in testing as well, according to the task of designing, developed a multimedia module system for evaluating the quality of aviation personnel.*

Methodology. *During the research the methods of analysis comparison are applied.*

The ***result*** *is a developed multimedia module system for evaluating the quality of aviation personnel.*

Originality. *The main features, functional requirements of the system are determined.*

Practical value. *A developed multimedia system can be used in the educational process of aviation personnel and checking qualifications of aviation personnel*

Keywords: *aviation personnel, multimedia system, test analyzer, psychological quality of human character.*

Introduction. Multimedia facilities and psychology can be defined as the role of application of psychological principles to aviation safety and welfare (flight-deck design, pilot selection and training, aviation safety research, maintenance human factors, cabin safety, air traffic control, and accident investigation. While a large part of research has focused on decisions dominated by accident analysis and reducing the influence of the human factor to improve aviation safety. The main focus of aviation psychology is to reduce human error throughout the system from the flight deck to the ground staff. But ‘human error’ is merely the beginning of an explanation. In the same way that aircraft accidents seldom have a solitary cause, human mistakes also rarely have a single underlying contributory factor. Error is the product of design, procedures, training and/or the environment, including the organizational environment. As we shall see, it is an oversimplification to suggest that any accident is caused by ‘human error’ or ‘system failure’ alone.

Task. The task is the development of multimedia system that allows electronic constructor to create tests for a wide range of problems with aviation personnel.

Results. Aviation activities are physical and legal entities in the field of aviation and / or air traffic Ukraine [1]. According Darahanovoyi N.V. [2] the term "pilots" the legislation first appeared in the USSR Air Code of 1983. This Code has established that air staff includes personnel Aviation Company, organization, unit, educational institution, consisting of aviation specialists on professional basis. In other words it any workers in civil aviation, which are aimed at the realization of its objectives. Adopted in 2011, the "Air Codex of Ukraine" in paragraph 9 Chapter. 1 it is found that the aviation personnel consists of [1]:

a) received special training;

b) have the appropriate certificate;

c) carry out flight operation;

d) carry out aircraft maintenance;

e) exercise of air traffic;

f) providing technical operation of terrestrial.

Aviation psychology is part of aviation medicine, psychology, which studies the psychological characteristics of different types of aircraft and their relationship with the personality of the person performing this activity, to improve the efficiency and safety [3]. First of psychological examination to determine proficiency was made professor of psychology at Harvard University in G. Myunstenberzi complete group telephone operators in 1910 Since then, the psychological component selection is the professional selection for a number of professions. In aviation because of the complexity and danger of flight profession, the high cost of training of aviation personnel psychological selection widely used. Today the selection of the results of psychological examination included in the professional selection of applicants flying schools, along with the selection of the socio-political criteria, medical selection and selection based on the results of entrance examinations.

Conducting psychological screening in aviation schools conducted usually using three groups of methods. The first group consists of hardware techniques. The second group includes psychological tests that can be described as psychometric because they yield quantitative expression of a particular quality of the subject (mental function). The third group consists of so-called personal technique. Surveys by the first two groups of techniques are required.

Instrumental methods. Create different versions of hardware techniques was the result of so-called synthetic approach for developing psychological problems of selection. The main goal of this approach - creating apparatus that simulates the flight activity and test applicants to work with this particular model.

Psychometric test. The second group of techniques constitute tasks which makes it possible to assess the development in the subject of a mental functions. Psychometric examination is a required component of the analytical approach of psychological screening. Analytical approach involves drawing pre psyhohramy some aviation professions, that the list of basic skills - those properties and qualities of mind that are essential for human skills development in the field of aviation.

In aviation educational institutions is mandatory survey students on such techniques as "searching for numbers with switching"; "Numerically-letter combination"; "Compass"; "Establishment of laws"; "Scale".

There is examination by two discussed methods to determine and evaluate the presence of some specific flight abilities. This in turn allows prompt possibility of successful teaching trainee. However, implementation of this feature in the learning process in the school depends on several circumstances, among which an important role will play the so-called personal characteristics of the student.

So being developed and are widely approved methods that constitute the third group of experimental examination methods - personal technique. Results of the study of these techniques can be used primarily to implement the principle of individual approach to learning. At the same time, these results also have prognostic significance.

Personality techniques. Widespread classification of personality traits today not only is experimentally justified as historical system that caused the development of the doctrine of the relevant category of personality: temperament, character, ability and focus.

This fact gave rise to, and continues to give rise to attempts to offer a new approach to the allocation of different personality characteristics (psychological personality categories and according classification of "types" personality).

Measures of psychological screening in aviation are not limited to the selection of applicants. Conducting psychological screening in educational institutions is actually prolonged nature. Conduct psychological research aviation personnel can be made at any time.

Experimentally-psychological research of aviation personnel is recommended in the following cases:

- after hit in emergency situations;
- the systematic lag in training and combat training;
- if necessary retraining for a new type of control of the aircraft.

In addition, during periodic staff of expert medical examination as may be prescribed experimental psychological research.

The study (survey) conducted aviation personnel are usually more focused and in-depth study and evaluation of the development of certain mental qualities using as already mentioned, and a number of other psychological techniques.

Multimedia technology is called technology that defines the order of development, operation and use of information processing of different modalities [5].

In the conventional definition, "media" means a special interactive technology, which is using hardware and software provides the work with computer graphics, text, speech support, high-quality sound, static images and video.

Multimedia finds its application in various fields, including advertising, art, education, entertainment, aviation, medicine, technology, business, research.

Multimedia system is a set of similar subsystems that provide the ability to create, store and play audio and video information [5-6]. An important characteristic of multimedia systems are high quality playback of all subsystems. Conventionally multimedia system can be divided into the home and commercial or general use.

The developed system should facilitate the definition of human nature by creating tests in the form of short stories, and to allow the passage of their end users. In addition, it should enable the collection of statistics of the test to be used analyzer customer. That is the main purpose of the development system supports the simplification and acceleration of the process of determining the nature of man.

The system should include the following components:

• Data Center;
• backup data center;
• complex system of information protection;
• special software.

Roles of stakeholders interaction:

• Inside: psychologist, member of tests

• external: analyzer.

In addition, the developed software system must have the inherent properties [4]:

1) reliability that is a group of properties (reliability, recoverability), which makes software's ability to survive and transform raw data into the expected results in the given conditions for a specified time;

2) usability that is the ability of the software to be understood, to explore suitable and attractive to the user when used in specified conditions;

3) maintenance that is the ability to modify software, which can contain the fix, improve or adapt the software to changes in environment, requirements or functional specifications;

4) portability that is the ability of software to be transferred from one organizational, hardware or software environment to another.

So, the developed system should facilitate the definition of human nature by creating tests in the form of short stories, and to allow the passage of their end users. In addition, it should enable the collection of statistics of the test to be used analyzer customer. That is the main purpose of the development system supports the simplification and acceleration of the process of determining the nature of man.

There were provided functional system requirements to multimedia system. Among the functional requirements of the system are: create a new test, edit / delete test, create and add slides, their edit; edit slide text, edit the background slide (fig.1).

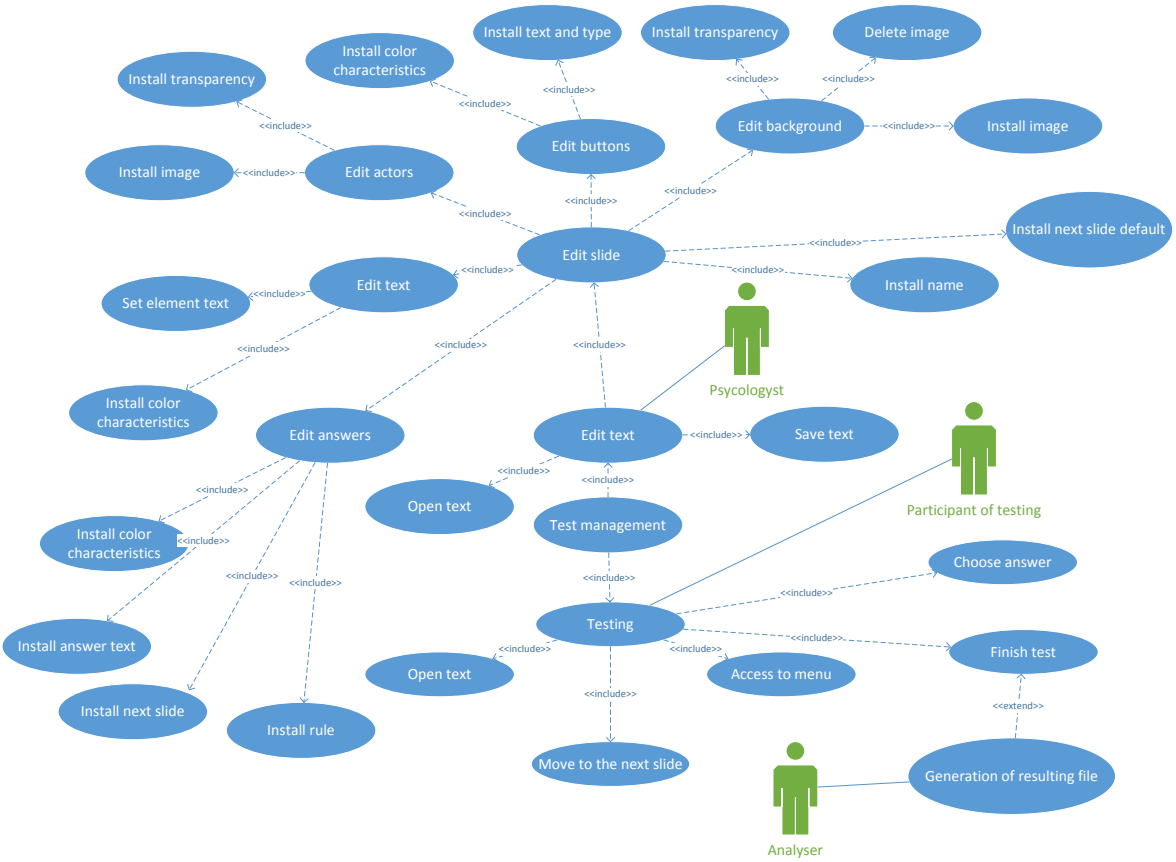

Figure 1. **Use-case diagram of the system**

To develop a software system, there were used environment Visual Studio 2013, .NET Framework 4.5 platform and programming language C #.

The program is designed to automate the process of creating and passing tests. It has its own database, which is implemented through serialization.

The system is divided into several components, which are represented in the diagram of components (fig.2).

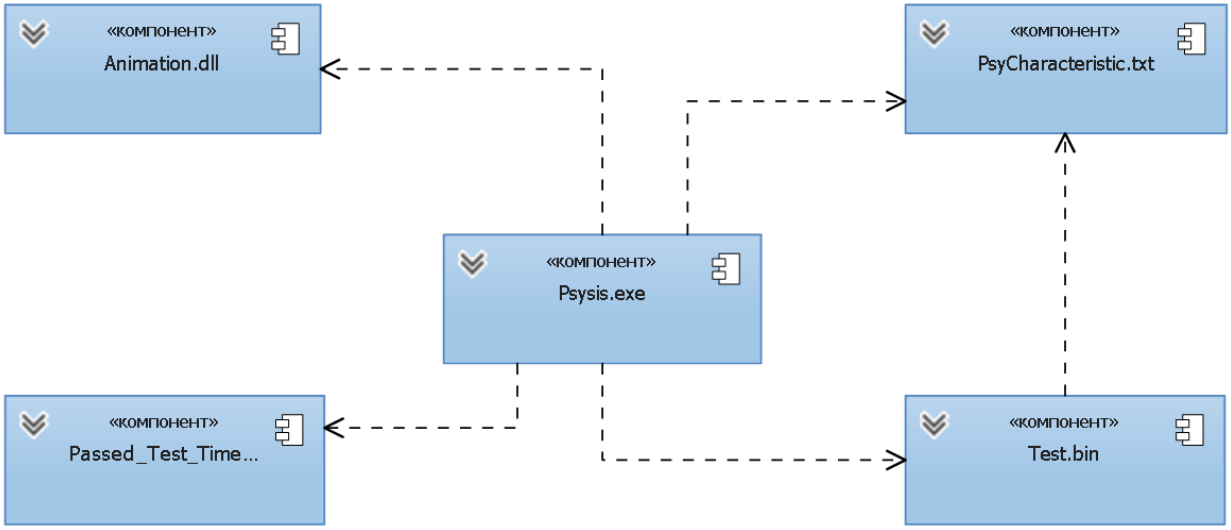

Fig. 2. **Diagram of system components**

Component Animation.dll contains logic to transition animations.

Component PsyCharacteristic.txt contains a list of rules, which are used to further test and analyzer for deciding about human character. It is saved in format Json.

Component Test.bin contains a list of slide elements, slide transitions, which are possible and appropriate, that is a directly test file.

Component Passed_Test_Time.json contains a list of questions, answers to questions and appropriate. Analyzer uses them to decide a human character. It is saved in format Json.

Psysis.exe component contains basic logic system for creating and passing tests.

In the end some recommendations of the system usage for the user.

To run in Windows OS family made running executable file in the working directory Psysis.exe program.

After starting the program window appears on the screen. To facilitate user interaction with the program provided for the withdrawal of tooltips.

To create the test it is necessary to open the edit tab and click buttom «NEW TEST» (Creating a new test); to specify the name of the test.

To add slides it should be chosen button «ADD SLIDE» and set the next slide by default.

To test compliance transitions between slides, click the graph display. In the column marked in green original slide gray - intermediate, red - final and yellow - the slides to which no transitions.

To set the background slide, open tab «Background» and select the slide background by pressing the «Select image». It indicates the need for transparency substitution method.

Next, to add the desired text on the slides, click on «Add text», located in tab «Texts» and optional change text color. In addition, you can change the position of the element dragging it in the appropriate place with the mouse, or resize it by pulling the corner element.

To specify answers on questions, it is needed on the tab «Answers» to click «Add answer block», and then click «Edit answers collection». It is appeared on the screen window, in which the user can edit the answers.

In order the user, which will hold test, could go to the next slide, it is necessary to set controls. They are located on the tab «Buttons». There are 3 types of buttons: «Next» - display the next slide, «Menu» - close the test and return to the main window and «Finish» - save results of testing (fig.3).

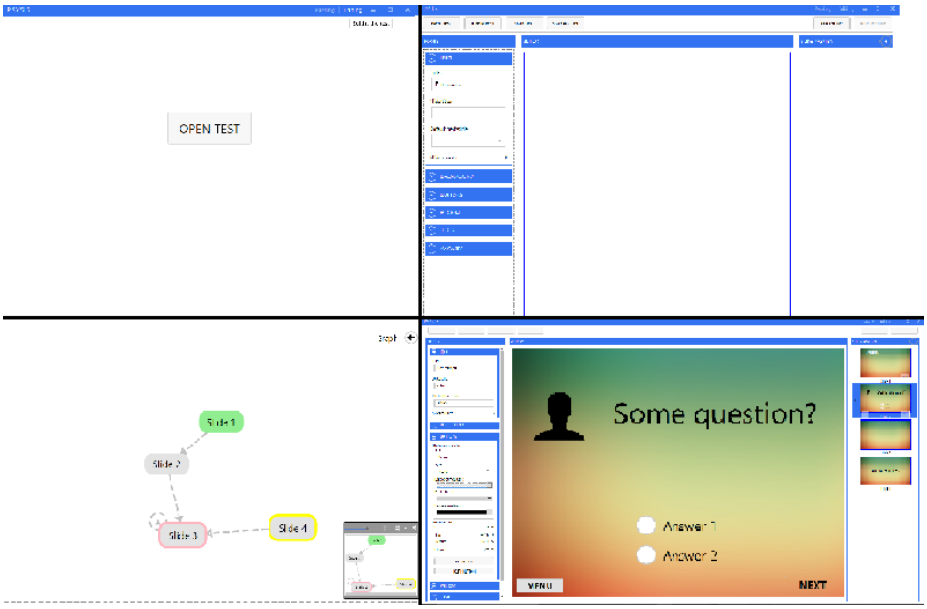

Figure 3. **The interface of the systems**

Conclusions. Aviation activities due to the action of air staff of various stress factors which lead to the depletion of psychological and physiological resources personnel, resulting in a decrease in the level of its adaptability, general health, functional and professional reliability. These processes are accompanied by negative changes in psychological terms – lower motivation for professional activity, increased degree of personal risk, reduced cognitive performance (attention, memory, operational thinking) the development of a state of high anxiety and nervous and emotional tension, loss responsibility for the consequences of their action and confidence in their capabilities.

Psychological support aviation safety should include measures of psychological and physiological research staff, which allow: to identify important professional-quality professionals; explore the functional states associated with professional activity; identify risk, characterized by a reduction in functional reliability. Also, these studies provide an opportunity to develop modern systems of professional selection and evaluation of psychological qualities aviation personnel.

Developed in multimedia system graduation project evaluation psychological qualities of personnel is designed to simplify the process of building a test score psychological qualities and to improve and speed up the process of passing the testing, processing test results.

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МУЛЬТИМЕДІА СИСТЕМА ОЦІНКИ ПСИХОЛОГІЧНИХ ЯКОСТЕЙ АВІАЦІЙНОГО ПЕРСОНАЛУ. МУЛЬТИМЕДІЙНИЙ МОДУЛЬ

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Мета полягає у підвищенні рівня безпеки авіаційного персоналу за допомогою оцінки його психологічних якостей. У процесі дослідження, було розглянуте місце програмного забезпечення в тестуванні психологічних якостей людини, розглянуті типи мультимедійних систем, які використовуються в тестуванні, а також розроблений мультимедійний модуль для оцінки якості авіації персоналу.

Методологія. У ході дослідження був застосований метод аналізу.

Результат. Розроблений модуль мультимедійної системи для оцінки психологічних якостей авіаційного персоналу.

Наукова новизна. Були визначені основні особливості та функціональні вимоги до системи.

Практична значимість. Розроблений мультимедійний модуль може бути використаний в навчальному процесі авіаційного персоналу та перевірки кваліфікації авіаційного персоналу

Ключові слова: *авіаційний персонал, мультимедійна система, тест-аналізатор, психологічні якості людського характеру.*

МУЛЬТИМЕДИА СИСТЕМА ОЦЕНКИ ПСИХОЛОГИЧЕСКИХ КАЧЕСТВ АВИАЦИОННОГО ПЕРСОНАЛА. МУЛЬТИМЕДИЙНЫЙ МОДУЛЬ

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Цель заключается в повышении уровня безопасности авиационного персонала с помощью оценки его психологических качеств. В ходе исследования, был рассмотрен место программного обеспечения в тестировании психологических качеств человека, рассмотрены типы мультимедийных систем, которые используются в тестировании, а также разработан мультимедийный модуль для оценки качеств авиационного персонала.

Методология. В ходе исследования был применен метод анализа.

Результат. Разработан модуль мультимедийной системы для оценки психологических качеств авиационного персонала.

Научная новизна. Были определены основные особенности и функциональные требования к системе.

Практическая значимость. Разработанный мультимедийный модуль может быть использован в учебном процессе авиационного персонала и проверки квалификации авиационного персонала

Ключевые слова: *авиационный персонал, мультимедийная система, тест-анализатор, психологические качества человеческого характера.*