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# COMPUTERIZED SYSTEM FOR DETERMINATION OF THE PSYCHOLOGICAL READINESS OF THE CIVIL AVIATION STUDENTS IN EMERGENCY SITUATIONS

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Specificity of flight activity is the need to perceive and process significant amounts of information, often not mutually related, which is complicated by significant emotional tension [1]. However, unfortunately, the qualities that allow the pilot to successfully operate in a non-standard situation are not sufficiently formed in the students or cadets. As a rule, in critical cases the student-pilot prevents insufficient speed of perception, switching and distribution of attention, low level rapid and correct response skills formation, stereotyped, standardized thinking, excessive automation of motor skills acquired during training [2].

The successful flying activity involves the presence of well-formed and well-established professional skills, all of which is carried out in strict sequence as part of a single unit and do not require constant conscious control [3]. As is known, in each flying skill can be distinguished sensory, intellectual and motor components [4]. The sensory component of the flying skill involves the special nature of the perception of information, the effective control over the readings of the devices, a well-worked out sequentially [3, 4]. The sensory components of flight skills include the ability of the pilot to determine the flight mode of the engine, visually set the distance to objects, the height of the flight (especially during landing, when you need to determine the altitude aircraft). The intellectual component of flying skills are the techniques of information processing, such as the ability to build an action program, perform computational and logical operations, classify features [5]. It should be noted that the sensory and intellectual components of piloting skills are ensured by the flow of complex psychophysiological processes that are not always amenable to objective

diagnosis and assessment [4-6]. The direct connection of signal perception and the corresponding movement is manifested in the simple and complex sensorimotor reactions of the pilot, as well as the sensorimotor coordination [4-5], which is manifested in flight as a "feeling of the plane" and is the psychological basis of piloting technique [3-6].

An emergency will mean the complication of the flight conditions that makes it impossible to carry it out further on the intended plan as a result of the threat of an accident. An accident may occur regardless of the pilot's actions as a result of a technical malfunction or erroneous pilot action. This situation makes a flight event possible, but does not necessarily imply a fatal outcome. In the future, it may be eliminated by the correct actions of the pilot or vice versa - can lead to the failure of the flight task, equipment failure, injury, even the death of the crew (catastrophe). Usually, an accident occurs as a result of incorrect pilot actions aimed at eliminating an emergency. The main difference between an emergency situation and normal flight conditions is not so much the increased emotional intensity and complexity of the motor actions, but rather the uncertainty, lack and ambiguity of information, the absence of a pre-planned action plan [6]. In extreme conditions, every neutral signal (noise, vibration, acceleration, control effort) can become the bearer of important information. The process of obtaining this information and analyzing it is the content of the mental effort to make a decision, and it also takes a major amount of time that is devoted to eliminating an emergency.

To ensure a complex analysis of indicators of the psychophysiological state of the civil aviation student to assess his preparedness for emergency situations, a psychodiagnostic model was developed (fig. 1) [1, 2]. This model consists of the main components that are blocks: functional, cognitive-perceptual, psychophysiological, individual-typological and motivational. These are separate methods and tests for individual assessment of certain components of the psychophysiological and emotional state of the student pilot [2].

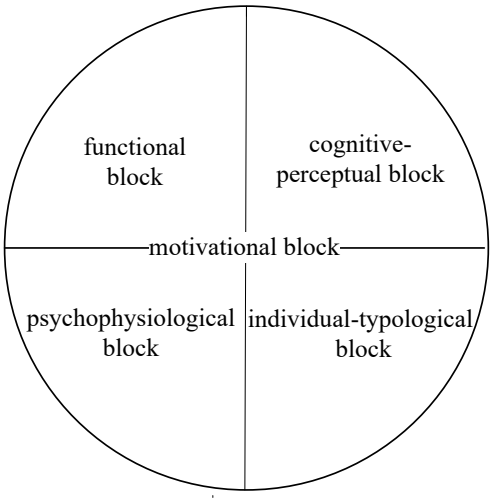


Figure 1 – Model of complex psychodiagnostics of the professional reliability of the civil aviation student

Based on the developed computerized biotechnological systems [4-13] that are used in various fields for information technology, surgery, psychology, and

automated testing of motor skills [8-13], it was proposed to develop a computerized system that consists of a hardware and software complex.

The developed system for determination of the psychological readiness of the civil aviation students in emergency situations includes: a central computer; a personal computer (PC) for students-pilots; digital camera for recording testing; an interface device and data exchange; a graphics tablet (digitizer) high-resolution, which detects a position of a stylus when it is near a surface of this device; gyroscope and sensors on the hand for registration tremor: additional devices, that concomitant sound, vibration, and lights for dynamics tests (fig. 2).

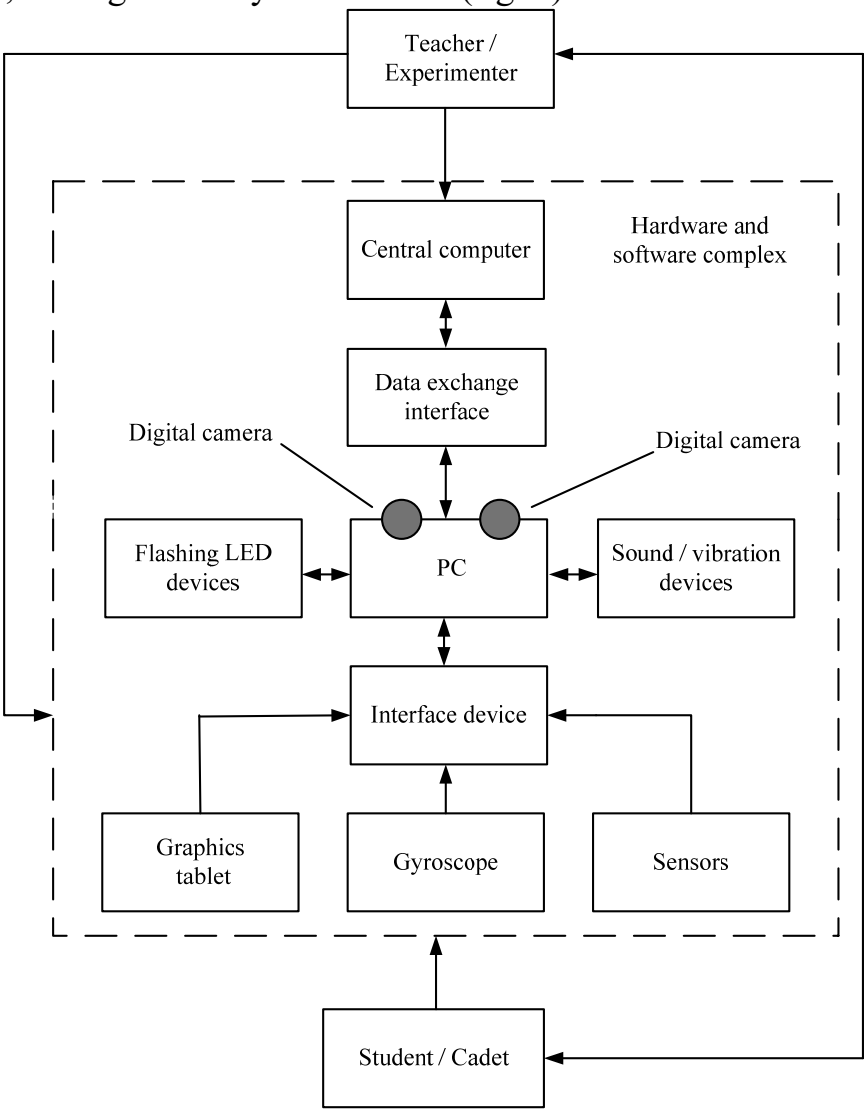


Figure 2 – Computerized system for determination of the psychological readiness of the civil aviation students in emergency situations

The obtained results show the need for using integrated indicators in assessing the preparation of pilots for emergencies. The designed system allows for solving this issue. The next steps are testing system components.

**References**

1. Кабанцева А. В. Информатизация процесса психодиагностики / А. В. Кабанцева, К. Г. Селиванова // Інформаційні системи та технології в медицині:

зб. наук. пр. ІІ Міжн. наук.-прак. конф. (ІСМ-2019). – Харків: Нац. аерокосм. ун-т ім.. М.Є. Жуковського «Харків. Авіа. Ін.-т», 2019. – С. 41-43.

2. Кабанцева А.В. Адаптованість водіїв до виконання професійної діяльності / А.В. Кабанцева // Науковий вісник Херсонського державного університету. Серія «Психологічні науки»: зб. наук. пр. – Херсон: «Видавничий дім «Гельветика», 2016. − № 5. – Т.2. – С. 155-159.

3. Лебедєв В.В. Застосування multi-touch технології для експрес-оцінювання рівня стресостійкості льотного складу повітряних суден / В.В. Лебедєв, К.Г. Селіванова // Збірник тез доповідей ІІ Всеукраїнської науково-практичної конференції молодих учених, курсантів та студентів «Авіація, промисловість, суспільство» – Кременчук, 2019. – 464 с. – С 265-266.

4. Selivanova K.G. Computer-aided system for interactive psychomotor testing / K. G. Selivanova, O. V. Ignashchuk, et. al // Photonics Applications in Astronomy, Communications, Industry, and High Energy Physics Experiments. Proc. of SPIE – Proceedings Volume 10445, 2017. –104453B.

5. Селиванова К. Г. Компьютерная система интерактивного тестирования психомоторики / К. Г. Селиванова // Полиграфические, мультимедийные и web-технологии. Т.1. Тез. Докл. 1-й Международной науч.-техн. конф. – Харьков: ХНУРЭ, 2016. – С. 81-82.

6. Selivanova, K. Determination of the basic parameters of sensor devices for the implementation of psychoneurological research with the introduction of multitouch technology / K. Selivanova, O. Avrunin, N. Kazimirov // Innovative Technologies and Scientific Solutions for Industries, 2020. No. 1 (11), P. 147–155. DOI: https://doi.org/10.30837/2522-9818.2020.11.147

7. Селиванова К.Г. Биотехническая система диагностики состояния мелкого моторного развития / К.Г. Селиванова, Ж.Б Иванченко, О.Г. Аврунин // Вестник Нац. техн. ун-та "ХПИ": сб. науч. тр. Темат. вып. : Новые решения в современных технологиях. – Харьков : НТУ "ХПИ". – 2015. – № 39 (1148). – С. 78-82.

8. Selivanova K. Quality improvement of diagnosis of the electromyography data based on statistical characteristics of the measured signals / Karina G. Selivanova, Oleg G. Avrunin // Photonics Applications in Astronomy, Communications, Industry and High-Energy Physics Experiments edited by Ryszard S. Romaniuk. Proc. of SPIE. – 2016. – Vol. 10031, 100312R.

9. Капля М. А. Возможности применение гироскопа для оценки тремора конечностей / М. А. Капля, Д. А. Костин, М. Ю. Тымкович // XVII Міжнародна науково-технічна конференція «Фізичні процеси та поля технічних і біологічних об’єктів»: матеріали конференції. – Кременчук: КрНУ, 2018. – С. 215-216.

10. Тымкович, М. Ю. Проблемы оптической регистрации положения маркеров в хирургической навигационной системе / М. Ю. Тымкович, О. Г. Аврунин, А. И. Бых // Функциональная база наноэлектроники : сб. науч. тр. V Междунар. науч. конф., 30 сент. – 5 окт. 2012 г. – Х. ; Кацивели : ХНУРЭ, 2012. – С. 298–301.

11. Тымкович М.Ю. Разработка навигационной системы для ринохирургии / М.Ю. Тымкович, О.Г. Аврунин, Х. Фарук // Энергосбережение, энергетика, энергоаудит.–2013. –No8 (114). –С. 116–123.

12. Тымкович М. Ю. Оптический метод регистрации пространственного положения хирургического инструмента в компьютерной навигационной системе / М. Ю. Тымкович // Вестник Нац. техн. ун-та "ХПИ" : сб. науч. тр. Темат. вып. : Новые решения в современных технологиях. – Харьков : НТУ "ХПИ". – 2013. – № 18 (991). – С. 124-130.

13. Селиванова К.Г. Возможности исследования тонкой моторики рук в динамике с помощью графического планшета / К.Г. Селиванова // Сборник материалов докладов «Биотехнические, медицинские и экологические системы и комплексы», Биомедсистемы, 2012. – С. 164-166.