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SYSTEM OF MEDICAL SUPPORT OF NAVAL AVIATION OF THE NAVY: PROBLEM ISSUES AND WAYS OF THEIR SOLUTION

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The article discusses the problematic issues of medical support of naval aviation: in the organizational and staff structure of the medical service, in the field of material support of the medical service units, medical and psychological rehabilitation of the flight personnel, in the field of social protection of aviation medicine specialists of the Navy. The authors suggested ways to solve these problems. Necessity of centralization and effective quantitative and qualitative optimization of the medical personnel who provide medical support for naval aviation is noted. Attention is paid to the developing of a system for training medical personnel providing flights, as well as the creation of conditions that guarantee high-quality medical and psychological rehabilitation of flight personnel. Introduction of modern technologies and equipment into practice of aviation medicine of the Navy, construction and implementation of total renovation and external repairs of buildings of medical units is considered to be an important independent direction in the development of the medical support system for naval aviation. The authors emphasize the expediency of the improving the regulatory framework aimed at ensuring the social protection of aviation medical personnel of the Navy. Development of the medical support system for naval aviation for the period up to 2025 is proposed to be implemented by the stages: the first stage (2018–2020), the second stage (2019–2025). General and particular indicators of effectiveness of package of measures aimed to improve the system of medical support of naval aviation are formulated.

Key words: marine medicine, aviation medicine, state aviation, naval aviation, the Navy, medical support, medical flight commission, ensuring the aviation safety, human factor, federal aviation regulations, rescue parachute group, air base, aviation technical base, flight personnel.

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Naval aviation (hereinafter NA) is a branch of the Navy earmarked for search and destroy of enemy combat forces, landing parties, convoys and single ships (vessels) at sea and on bases; air defense of ship groups and fleet installations; scraping of aircraft, helicopters and cruising missiles; aerial surveillance; orienting friendly striking forces to naval counter forces and acquisition. NA is used for minelaying operations, countermine operations, electronic warfare, airlift delivery, search and rescue operations at sea. NA is based on the aircraft (helicopters) of different purpose. NA achieves the tasks independently and in conjunction with other branches of the Navy as well as with other branches of the Armed Forces of the Russian Federation [1, p. 941].

A medical support holds a specific place in the overall support of NA. The preservation of health and optimal psychophysiological capabilities in air and engineering and technical staff [2, p. 7–14; 88–116] is the key to the effectiveness of this support.

For reference: air staff is a part of aviation staff with special training which is directly involved in aircraft and helicopter flights as the crew members.

Strict health requirements are specified to crew's members in view of specific work conditions. Air staff includes air pilots and air navigators, onboard engineers, onboard technicians, onboard mechanics, air gunners, radio-gunners, wireless operators.

Functional role and place of a person change in the man-machine-environment system. A personal responsibility increases with job complexity.

Complication of the airplane structure as well as increased use of modern electronic, nonmechanical systems, broadening of range and scale of application of material and human resources of the MA of the Navy of the Russian Federation in the World Ocean suggest mainstreaming of the ergonomics (human factor) [3, pp. 37–44].

Medical services of the NA branches of the Navy face, on the one part, specific tasks of medical support of the flying personnel and, on the other part – common tasks on medical support basic for all branches of the Navy.

The primary tasks of the aeromedical support are the following: flight medical support, medical support of the flying personnel and technical engineer personnel, control of the flying personnel, preparation for outpatient and inpatient examination of the flying personnel by flight medical expertise (FME), carrying out medical measures on psychophysiological and medical physiological follow-up of the flight personnel under the conversion to the new type and ship-based aviation personnel, providing parachute jumps, participation in search and rescue flight operations as a part of paratroop groups and ground-based search-and-rescue team, keeping medical record and report of medical support for the flying personnel, flight safety and research of aircraft accidents and incidents.

The primary tasks of the medical support basic for all branches of the Navy are the following: organization and implementation of medical-preventive activities among the ground crew, support of a FME work on the examination of the flying personnel, military medical training, hygienic training and education of the staff, healthy lifestyle promotion, combat training of the medical corps, medical control of living environment of the staff, medical support of combat training and daily activities of fleet air force branches, medical equipment of units on air force base (AB) or air-technical base (ATB) with medical equipment, drugs and medical products, medical recording and audit etc.

Professional activities of the flying personnel set high requirements to their health status. Considerable and ever growing range of parameters effecting the aviation pilot and flight conditions such as acceleration, noise, vibrations, electromagnetic radiation, high temperatures, high intensity of work, high intellectual overheads, hypodynamia, monotonia and others, are the potential health deterioration factors which may impact on a performance of professional activities and flight safety [2, p. 7–14; 88–116; 4, p. 47–48; 5, p. 57–63]. Comparing with the flight personnel work, the aviator work is combined with the range of specific features:

- complexity of short take-off and arrested recovery on ship-based aircrafts, flying-off – boarding of helicopters from small-scale pad under conditions of pitching;
- a complexity of overwater orientation at a considerable distance from coastline;
- an absence of alternate aerodromes and complexity of a sea rescue;
- a problem of measurement of flight altitude by eye;
- adverse impact on visual perception of sun and moon glints at waterplane;
- more frequent illusions due to the absence of visual references;
- effect of hydrometeorological features of navigation and parameters of ship's habitability.

In view of this, maintaining of performance and professional reliance of the flying personnel is the key responsibility of the medical service of aviation units of the Navy.

The effective performance of unified medical supply system of the NA is defined by three basic backbone parameters:

- development of organizational system allowing for high-quality medical support for the flying personnel and technical engineer personnel of all categories (within the limits of state guarantees);
- development of infrastructure and resources' provision of aviation medicine including financial, technical, staffing and technique of health administrating authorities, medical organizations, medical posts, and other medical units;
- availability of sufficient number of qualified health care personnel who can solve tasks that are raised before aviation medicine.

The noted parameters are interdependent and interdeterminant. Thus, modernization of unified medical supply system of MA of the Navy requires harmonious development of all of them and entire system.

In last decades, ***number of problems*** having a meaningful effect in performance of marine activities, accumulated in modern health maintenance organization of the NA of the Russian Federation.

At first, these are problems in organizational and staff structure of medical system of the NA of the Russian Navy.

At present, the Chief Command of the Russian Navy does not have the position of an air medical officer responsible for united approach to solving issues of health maintenance organization. Besides, there is no personnel position of aviation surgeons in the Chief Command of the Navy. Therefore, there is no necessary centralization of organization of medical support for the NA, aimed at the systemic solution of all the problems of medical support of flights, the preservation of the long-term vigilance performance of a flying personnel and technical engineer personnel.

Air medical officers are represented only in the primary military unit, with the exception of the Northern Fleet, where, in connection with the formation of a unified strategic command, a specialist in organization of aviation medical support and naval aviation control of the Black Sea Fleet appeared, and in 2017 the position of the Head of Aviation Medicine Service – the Chairman of FME was introduced.

In the aviation units of the Navy, the chiefs of medical service have training in organization of aviation medical support; other medical officers trained in the specialty "General Medicine in Aviation". There are no specialists of aerospace medicine in the NA units.

Air Base and Air Technical Base consist of medical aid stations including hospitals with a bed capacity of 15–30 beds. In addition, there are some military units where a medical service is represented by a medical attendant.

Medical support of the flying personnel and technical engineer personnel is carried out according to a territorial logic on a general basis by health facilities that do not know the specifics of flight labor and do not have significant experience in the prevention and treatment of diseases among aviation specialists.

Aeromedical support is assigned to the resident medical officers of the units of the MA of the Navy, irrespective of their specialty, cleared for aeromedical support by orders of the relevant commanders and directors.

Training of doctors in aviation medicine specialty is carried out at the faculty of postgraduate and additional education of the S.M. Kirov Military Medical Academy (St. Petersburg). The educational process is organized and held at the Aerospace Medicine Department of the S.M. Kirov Military Medical Academy. In addition, professional retraining is fulfilled in some civilian medical education organizations.

The specialty "Aerospace Medicine" is included in the Nomenclature of specialties of specialists with higher and postgraduate medical and pharmaceutical education in the Health System of the Russian Federation, approved by order No. 1183N of the Ministry of Health and Social Development of the Russian Federation of December 20, 2012. The qualification requirements for this specialty are approved by order No. 415N of the Ministry of Health and Social Development of the Russian Federation of July 7, 2009. The specialist qualification is the "Doctor in aerospace medicine".

During the training, the doctor in aerospace medicine studies aviation physiology and pathophysiology, aviation psychology and psychophysiology, ergonomics and aviation hygiene, aviation toxicology, radiobiology and pharmacology. Additionally, the doctor studies organization of aviation medicine, the medical science of aircraft accidents and flight medical expertise.

The flight medical officer should have knowledge of the organization and tactics of the medical service of the NA, the management of the daily activities of medical subdivisions of aviation units, and mobilization training.

The amount of disciplines studied in the S.M. Kirov Military Medical Academy depends on the type and timing of training of surgeons.

The main documents regulating the medical support of flights are the Federal Aviation Regulations of State Aviation (approved by Order No. 275 of the Minister of Defense of the Russian Federation of September 24, 2004) (FAR SA) and Federal Aviation Medical Support Regulations of State

Aviation (approved by order No. 265 of the Minister of Defense of the Russian Federation of April 27, 2009) (FAMSR SA).
The medical examination of the flying personnel is carried out in accordance with the requirements of the Order No. 455 of the Minister of Defense of the Russian Federation of October 9, 1999 "On approval of the regulations on medical examination of the flying personnel of the Armed Forces of the Russian Federation".
The medical and psychological recovery (MPR) of the military personnel is uppermost in the medical support system of the Navy. MPR is a medical and psychological package aimed at correction of psychophysiological disorders induced in the military after execution of combat missions.
The MPR of the military including the flying personnel is held in accordance with the requirements of the Order No. 60 of the Minister of Defense of the Russian Federation of January 27, 2017 "On medical and psychological recovery in the military".
The Ministry of Defense possesses a developed network of health resort institutions consisting of 41 military sanatoriums, 6 holiday hotels and 5 recreation centers, with a capacity of 17 thousands guests, that allows to cover all patients in need of recovery measures on medical indications [7, p. 9].
At the present time, aerospace scientific research (ASR) in the NA is carried out
mainly by naval aeromedical laboratories (NAL) and medical service of Combat and Conversion Training Center of the Flying Personnel of the NA. The research proposal is defined by the command of the NA or by investigators themselves.
According to FAMSR SA, paragraph 5 "… medical support of the flights is provided by appropriate directors of medical services, doctors of independent squadrons and other medical executive officers who personally admitted the flying personnel and the technical engineer personnel to flight operation…with appropriate professional certificate". A kind of certificate is not specified. The medical officer admitting the flight operation shall have a certificate in Aerospace medicine but, at the present time, there is almost no such certificates that makes the legal bearings of a case of a flight surgeon vulnerable. It is quite impossible to organize an occupational retraining of the entire medical staff within a short time.
According to FAMSR SA, paragraphs 683, 692, 696, 697, 698, 703, the following medical workers are assigned from the medical services for flight shift period (2 or 3 in a day): one duty medical flight officer, one chief of aerodrome medical station, one physician of ground search and rescue team and, in case of search and rescue support activities of an air unit, one more physician of rescue parachute group (RPG) is assigned additionally, taken all together – 4 persons. Aerodrome medical station should be fitted with ambulance vehicles and appropriate medical equipment. There is no required number of medical officers in units even without including vacations and travels.
There are 4 positions of physicians in the staff of AB and ATB. It does not seem possible to fill up these positions only by physicians in outlying garrisons due to the lack of physicians in a settlement and low salaries in metropolitan areas. At the same time, flight shift at an aerodrome imposes that medical flight officer is on duty to 12 hours at that, part of the flight time summary falls on a nighttime (according to any air combat training program). These hours are free of charge for civilian medical personnel, extra rest days shall be provided in the amount approved by the Labour Code of the Russian Federation No.197-FZ of December 30, 2001.
There are no career prospects for air medical officers. The main medical officer grade for fleet is a senior lieutenant of the medical service.
There are no positions of physical therapy technician in medical stations of aviation units that does not allow to conduct therapy fully. Not all medical stations have dental officer being in charge of a pharmacy and sufficient number of nurses.
Medical ambulance of air towns is generally presented by one ambulance that is nothing. It may be used for flights (aerodrome medical station) or for medical support according to general system of therapy and evacuation measures in military town (off-aerodrome).
There is no organic RPG in all units of the Navy. Generally, RPG consists of two parachuters (without medical officer) which will not be able to provide medical care necessary for a personnel.
• Secondly, there are problems in the field of logistics of medical units of the NA. Most of the equipment used by aviation doctors is morally and technically obsolete (hypobaric pressure chambers, instruments for teaching breathing under excessive pressure, etc.).

• Thus, in the Navy, high-altitude pressure chambers are only available at 859th Center for Combat Use and Retraining of the Naval Aviation Composition (TsPP and PLS of the NA), in the Northern and Pacific Fleets. The altitude-chamber tests for the flight personnel of the Black Sea Fleet of the NA were organized on the basis of the TcBP and PLS of the NA, and for the Baltic Fleet in the branch No. 1 of the Federal State Unitary Enterprise "442nd Military Clinical Hospital" of the Ministry of Defense of Russia.

One of the key tasks being solved by aviation and space medicine specialists is the problem of ensuring flight safety, increasing the efficiency and reliability of professional activity, maintaining professional health and increasing the flight longevity of aviation specialists. "Lifts" in the chamber are the final stage of the medical examination, which is carried out for the medical-flight examination. Flight crews that have passed all preliminary diagnostic studies (clinical, instrumental, X-ray, laboratory, etc.) and are recognized as suitable for flight work are allowed to such "lifts". The chambers are not only a special method of research during medical flight examination, but also the means of psycho-physiological preparation for high-altitude flights.

Planned altitude-pressure tests are carried out in order to: determine individual body reactions to hypoxia, tolerance of short-term oxygen starvation and barometric pressure fluctuations, identify hidden forms of diseases and functional disorders that reduce the body's resistance to altitude factors; familiarization with the effects on the body of hypoxia of moderate degrees, as well as training in the elimination of oxygen starvation in cases of its development in flight, as a part of the psychophysiological training of flight personnel for high-altitude flights.

Currently, to achieve these goals, the survey in the chamber is carried out according to two main methods: staying at an altitude of 5 km for 20 minutes and staying at altitudes of 5 km and 6 km for 5 minutes each. The first procedure is carried out in conditions of aviation hospitals [8, p. 27–36]. The second one is used in terms of aviation parts.

• The chambers are among the few ground-based simulators allowing accurately simulate many of the factors of high-altitude flight.

• In addition, there are no modern psycho physiological software and hardware systems allowing responding on any changes in the state of health of flight personnel in a timely manner.

The condition of almost all premises and buildings of medical facilities and AML requires both cosmetic and major repairs. Most of the premises do not meet the requirements of sanitary and hygienic standards, and in this regard, the licensing of medical units is extremely difficult.

• Third, there are problems in the field of the MPR of aviation specialists, despite the significant work done by the Main Military Medical Directorate of the Ministry of Defense of Russia in preserving the professional health of the flight personnel of the Armed Forces aviation [9, p. 9–10].

• Taking into account the needs of this contingent, on the basis of 4 sanatoriums, specialized departments have been established for the treatment and rest of the military personnel of the Aerospace Forces and their families, and by the end of 2017, over 1 thousand officers and their families have received treatment and rest in them.

• Besides, in order to improve the effectiveness of remedial measures, by decision of the Minister of Defense of the Russian Federation, military personnel of the flight crew from 2017 have been given the opportunity to pass the MPR on an extraterritorial basis in the military sanatoriums of Crimea. The favorable climate of this region and the high recreational potential of military health centers make it possible to ensure the earliest possible restoration of the health of military personnel and preserve their professional longevity [9, p. 10].

The pace of the positive development of the MPR system in relation to flight personnel should be increased, having solved a number of other problems.

Thus, the command of aviation units of the Navy, flight personnel, which has 70% of the annual air raid, according to the order of the Russian Ministry of Defense of 2017 No. 60 "On medical and psychological rehabilitation of servicemen", sends to the MPR inactively due to professional need and high intensity of flight training. The flight personnel themselves do not always seek to get to the sanatorium due to the need to pay in full at the commercial cost of a voucher for each family member. According to clause 5 of Appendix No. 3 of the same order, the indications for conducting the MPR are determined based on the results of a medical examination of the health status of servicemen, an assessment of the degree of fatigue and the level of fighting capacity (efficiency) in health care

organizations of the Russian Ministry of Defense (clause 6). However, payment for the passage of a soldier to a treatment-and-prophylactic organization is carried out only when he is sent for treatment, and not for examination. For example, the Fedotovo garrison (Northern Fleet) is located 200 km to the nearest medical and preventive organization (military hospital deployed in the city of Yaroslavl). The fare is paid by the serviceman and is not compensated from the budget of the Russian Ministry of Defense.

Also, to date, there are no specific explanations on the order of direction of flight personnel with signs of moderate and severe fatigue (Appendix No. 9 "Provisions on medical examination of flight personnel of aviation of the Armed Forces of the Russian Federation"), overwork on medical and psychological rehabilitation before or after treatment in stationary conditions, as well as the type of sanatorium-resort institution (rest home, recreation center, sanatorium).

• Fourth, a number of problems in the field of social protection of aviation medicine specialists of the Navy remain unresolved.

Currently, the majority of aviation doctors are deprived of 20% of the allowance for special service conditions for ensuring flight safety, since their posts are absent in the "List of military posts replaced by military personnel — ground-based aviation specialists who ensure the safety of flights of airplanes and helicopters in aviation military units; military service in which gives them the right to receive their monthly allowance for their special conditions of military service in the amount of 20% of their salary for military posts", approved by the Minister of Defense of the Russian Federation on October 30, 2012, despite the fact that the medical officers actually perform the duties of the medical safety management.

To solve the formulated problems of medical support for naval aviation of the Navy, coordinated and purposeful activities of the Ministry of Defense of Russia and the High Command of the Navy to implement a set of organizational, regulatory, economic, financial and informational measures are required. At the same time, resource provision of measures for the implementation of these measures should be carried out at the expense of the federal budget funds allocated to the Ministry of Defense of Russia.

In which areas of the development of the medical system of the NA is it necessary to concentrate the main efforts? Improvement of medical support for the NA provides for the implementation of sets of measures **in the following areas:**

- ensuring the necessary centralization and effective optimization of the quantitative and qualitative composition of the doctors who provide medical support for the NA;
- development of a system for training medical personnel (personnel) providing flights to the NA;
- creation of conditions that guarantee high-quality medical and psychological rehabilitation of flight personnel;
- introduction of modern technologies and equipment into the practice of aviation medicine of the Navy, the construction and implementation of capital and cosmetic repairs of buildings of medical units;
- improving the regulatory framework aimed at social security of aviation doctors of the Navy.

The main activities for the implementation of these areas are:

a) **in terms of ensuring the necessary centralization and effective optimization of the quantitative and qualitative composition of the doctors who provide medical support for the NA:**

- inclusion in the staff of the Major Navy Command of the posts of the head of the service of aviation medicine and the chief medical inspector (aviation medicine) in order to ensure a unified approach to the organization and control of medical support for the NA;
- inclusion of the NA fleets of the post of head of the aviation medicine service and the post of chief medical inspector (aviation medicine) in the NA management ;
- reassignment of the AML to the Chief of the NA Fleet, bypassing the intermediate structures;
- raising by one level staffing and official categories of medical service officers (for example, the head of the AB medical service – the major of the medical service);
- introducing the position of a doctor-officer to the AB management staff; the staff category is "senior lieutenant of the medical service", since the head of the AB medical service is the head, to whom the medical personnel of the aviation squadrons based on individual aerodromes subordinates. In the case

of redeployment for flights at other aerodromes (at the same time for 2 or more), there is no possibility in organizing and implementing high-quality medical support for flights and flights;
- introduction to the staff of all medical posts of aviation units of the NA as a dentist and as a nurse for physiotherapy (physiotherapy treatment is one of the main types of treatment in the hospitals of the medical points), pharmacy manager;
- replacement in the states of medical centers of AB, aviation squadron of the positions of general practitioners (civilian personnel) by specialist doctors (civilian personnel) due to the impossibility of hiring three (four) general practitioners and remuneration of specialists of a different profile (while positions of general practitioner);
- highlighting the number of ambulance transport in aviation units and subunits of at least two, due to the fact that one ambulance vehicle is allocated to the aerodrome medical station (paragraphs 696, 703, 704 of the Order of the Ministry of Defense of Russia of September 24, 2004 No. 275 "On the approval of Federal Aviation Rules of State Aviation", while the second ambulance is used in the general system of treatment and preventive measures and for the provision of emergency assistance in the garrison (outside the aerodrome). Sanitary transport where possible placement of a stretcher must match the number of crew members of aircraft at the airport;
- introduction in parts of a regular RPG with the head-doctor in accordance with paragraph 338 of the Order of the Ministry of Defense of Russia of April 2, 2001 No. 155 "On approval of the Manual on parachute and rescue and airborne training of aviation of the Armed Forces of the Russian Federation";

b) in terms of the development of a system of training medical personnel providing NA flights:
- implementation of medical personnel training in aviation medicine only at the faculty (postgraduate and additional education) of the Military Medical Academy named after S.M. Kirov;
- implementation of the educational process and methodological work on the medical support of aviation should be carried out at the Department of Aviation and Space Medicine and the Department of Organization and Tactics of the Medical Service of the Fleet (with a course of tactics of combat equipment of the fleet) of the Military Medical Academy. S.M. Kirov;

c) in terms of creating conditions that guarantee high-quality medical and psychological rehabilitation of flight personnel:
- studying for providing free travel for inspection of aircrew, having 70% of the annual rate of flight, in order to determine the need for medical and psychological rehabilitation;
- clarification of the order and sequence of inpatient treatment and medical and psychological rehabilitation in the medical-prophylactic organizations of the Russian Ministry of Defense of flight personnel with signs of moderate and severe degree of fatigue;
- provision the aviation units command with priority in the direction of medical and psychological rehabilitation of the flight personnel recognized as needing it;

d) in terms of introducing modern technologies and equipment into the practice of aviation medicine of the Navy, building and carrying out capital and cosmetic repairs of buildings of medical units:
- introduction of modern psychophysiological software and hardware complexes into the practice of an aviation doctor, which make it possible to respond in a timely manner to changes in health status (types APCO-8, Diamed-MBS, TD-1 or their analogs) and carry out rehabilitation activities both at the base aerodromes and in long sea voyages [2, p. 488-508];
- studying for the planned replacement of such morally and technically outdated equipment as hypobaric pressure chambers and instruments for training breathing oxygen under excessive pressure;
- ensuring the overhaul and redecoration of buildings of medical stations and the AML and their reconstruction in order to bring into compliance with the requirements of sanitary and hygienic standards and subsequent licensing;
- taking the necessary measures to carry out the construction of new standard buildings of medical stations and the AML in case of impossibility of reconstruction of old buildings or their dilapidated state;

e) in terms of improving the regulatory framework aimed at social security of aviation doctors of the Navy:
- making the necessary changes to the "List of military posts replaced by military personnel — ground aviation specialists who ensure the safety of flights of airplanes and helicopters in aviation military

units, whose military service gives them the right to receive a monthly allowance for their special conditions of military service in the amount of 20% of their salary for military positions", approved by the Minister of Defense of the Russian Federation of October 30, 2012, by including military registration specialties and position codes of medical officers medical safety services.

It is proposed to implement the development of the medical support system of the NA for the period up to 2025 in stages.

The first stage provides for: "Ensuring the necessary centralization of the management of medical support for the NA and the effective optimization of the quantitative and qualitative composition of doctors providing medical support for the NA; development of a system for training medical personnel providing flights to the Naval Aircraft; ensuring the quality of medical and psychological rehabilitation of flight personnel and improving the regulatory framework aimed at the social security of aviation doctors of the Navy" (2018-2020).

The second stage provides for: "Introducing the modern technologies and equipment into the practice of medical support of the NA, the construction and implementation of major and minor repairs of medical buildings" (2019–2025).

As of December 2018, within the framework of the first stage, proposals were approved for amending annex 8 to the order of the Minister of Defense of the Russian Federation of 2010 No. 1350, which are planned for implementation in 2019–2020.

The above changes will allow increasing and optimizing the composition of specialists of the medical service of aviation units, solving the problem of the lack of necessary specialists, and increasing the interest of medical officers in service growth.

The AML is scheduled to be removed from the AB and reassigned to the chiefs of the NA fleets, which will not only fully carry out work on the inspection and certification of the entire flight personnel of the NA of each fleet, but also carry out activities to monitor the activities of the command of aviation units in matters of medical flight safety. The principles of continuity and unity of command in matters of organizing medical support for the NA will be implemented in order to ensure the most optimal support for fleet tasks. The problem of lack of ambulance will be solved.

In the framework of the second stage, the AML equipment was planned with the Edelweiss modern high-altitude hypobaric modules (HAHM). The first such module was delivered to the 859th TcBP and PLS of the NA in Yeisk, Krasnodar region, in November, 2017. This decompression system is equipped with modern means of objective medical and technical control with digital recording for storage and subsequent analysis of the data. By its capabilities, the HAHM is transportable, and it can be delivered or moved to any place of deployment by any available transport (by road, sea, rail or air). The HAHM can be operated in any climatic zone (including the Arctic) and in an open area, and it does not require placement in special buildings (hangars).

The decompression system is equipped with a TD-1 breathing simulator designed for comparative analysis and monitoring of the functional state of the body, conducting interval hypoxic training for the development of adaptive abilities, as well as for inhalation with artificial heated mixtures of oxygen and inert gases with the aim of accelerated recovery after physical and psycho-emotional stress.

In May 2018, state tests of the Edelweiss HAHM were successfully carried out, and in October 2018 the system was commissioned. In the near future it is planned to adopt the system for arming and equipping the AML of the fleets (Northern, Pacific, Baltic, and the Black Sea) until 2022.

Equipping the AML of the fleets with the modern Edelweiss HAHM will solve the problem of high-altitude and psycho-physiological training of flight personnel and medical flight examination.

Indicators of the effectiveness of the implemented set of measures to improve the medical support system of the NA will be:

1) The general:

a) raising the level of professional longevity of the flight personnel and the technical staff of the NA;

b) reducing the incidence of flight personnel and the engineering and technical staff of the NA.

2) The particular:

a) ensuring effective optimization of the quantitative and qualitative composition of the doctors who provide medical support for the units and units of the NA;

b) increasing the level of equipment of the units of aviation medicine of the Navy with modern technologies and equipment;

c) rise in the number of medical specialists in all levels of training who perform the tasks of medical support for the NA;
d) rise in the number of repaired and constructed buildings of medical points and the LAM of the NA.
Solving these problems will allow the unified medical system of the NA to function effectively, aimed at accomplishing the tasks facing naval aviation, as a kind of naval force, to the Navy as a whole, and to ensure the preservation of the human potential of the naval aviation of the Russian fleet.

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