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Unmanned Aircraft Systems of Ukraine: production and using

In the article analysis the problem of development and use unmanned aerial vehicles in Ukraine. Analyzed typical flight technical and operational characteristics, made conclusions about the prospects of development of the UAV. Formulated tactical and technical characteristics of aircraft. Conducted a brief overview of some of them.

Unmanned aerial vehicles (UAVS), also known as a drone, as an unmanned aircraft system (UAS), or by several other names, is an aircraft without a human pilot aboard and widely used in both military and in peaceful purposes. UAVS are able to conduct air reconnaissance and surveillance, transfer photos and video in real time. They can be carriers and targets, to operate in extreme conditions, including in areas that have undergone radiation, chemical or biological contamination in areas of disasters or intense fire countermeasures.

Multiple terms are used for unmanned aerial vehicles, which generally refer to the same concept. The term drone, more widely used by the public, was coined in reference to the resemblance of dumb-looking navigation and loud-and-regular motor sounds of old military unmanned aircraft to the male bee. The term has encountered strong opposition from aviation professionals and government regulators [8].

The term unmanned aircraft system (UAS) was adopted by the United States Department of Defense (DoD) and the United States Federal Aviation Administration in 2005 according to their Unmanned Aircraft System Roadmap 2005–2030.[5] The International Civil Aviation Organization (ICAO) and the British Civil Aviation Authority adopted this term, also used in the European Union's Single-European-Sky (SES) Air-Traffic-Management (ATM) Research (SESAR Joint Undertaking) roadmap for 2020 [3]. This term emphasizes the importance of elements other than the aircraft. It includes elements such as ground control stations, data links and other support equipment. A similar term is an unmanned-aircraft vehicle system (UAVS) remotely piloted aerial vehicle (RPAV), remotely piloted aircraft system (RPAS). Many similar terms are in use.

Unmanned technologies there since World War II. At first they were complex and expensive systems, which have only military purpose. Over the past two decades in this subject field was a real scientific and technological breakthrough. According to a leading international Association of unmanned systems UVS International, presently in development units are actively involved around hundreds of public and private enterprises in different countries [3].Ukraine in this case is also no exception.

In Ukraine, created the necessary production and technological base that has rich experience in development, testing and production of drones. These models

not only technical characteristics do not concede their world counterparts, but in many cases even surpass them.

Our country is one of the few countries that have a strong air design potential. The development of aviation industries can overcome the lag in building unmanned aircraft systems, competitive and take their place in the production and operation. One of the areas that allow to implement new ideas and professional expertise in the form of final products is the creation of small unmanned systems.

UAVs typically fall into one of six functional categories (although multi-role airframe platforms are becoming more prevalent): target and decoy – providing ground and aerial gunnery a target that simulates an enemy aircraft or missile; reconnaissance – providing battlefield intelligence; combat – providing attack capability for high-risk missions; logistics – delivering cargo; border control; research and development – improve UAV technologies; civil and commercial UAVs – agriculture, aerial photography, data collection [8].

The main advantage of UAVS, which recognize all experts is the lack of a the Board of the person, regardless of the complexity and danger of the tasks performed by UAVS, life pilots nothing threatening. UAV is able to act in the areas of biological, radioactive and chemical contamination. He does not need a complex system of life support crew. In a crisis situation the apparatus you can donate.

Depending on the management principles distinguish the following types of unmanned aerial systems: unmanned untethered; unmanned automatic; unmanned remotely-manned aircrafts (DPLA). In aviation after 2000 comes rapid expansion it is the last type of apparatus, and they said when taking the term «drone» or the abbreviation UAV [9, 1]. That is, the term «Remotely piloted vehicle», «AL», «UAV» meant exactly aircraft, which through communication channels managed by one or more pilots.

The crew of the UAV can also include Commander, operator of the sensors, the operator of fire weapons. UAV crews during long-term missions are changing, as generally, every 4 hours. Unmanned aerial vehicles, according to NATO standards, as well as aircraft with a pilot on board, divided into 3 classes: I - the full take-off weight of 150 kg, II - the full take-off weight of 600 kg, III - the full take-off mass of more than 600 kg. Class I is divided into categories: «micro» - up to 2 kg, «mini»- up to 15 kg, «small» - from 15 kg [9].

Ukrainian developments of UAVS, as at the beginning of the Russian armed aggression against Ukraine, Ukraine's armed forces have not had own modern unmanned aircraft. The existing armed with TU- 141 «swift» were morally obsolete. In desperate need of unmanned airplanes-scout First Nations meet the volunteers by adapting civilian vehicles to the requirements of military [4]. Were created, including Bat-1, PD-1 UAV «Fury». The latter was designed by Kiev NNP «Athlone AVIA» in 2014, his name came up with the most fighters who use this machine almost from the start of fighting in Donbass. The first battalion, who used «Fury» was «Donbass». In July 22, 2015 new unmanned aerial vehicles «Fury» officially taken by national Guard, as the Minister of the Interior Affairs of Ukraine Arsen Avakov reported [4]. These UAVS are also in service with the armed forces of Ukraine.

The Ukrainian state-owned defense company Ukroboronprom has built the country's first military unmanned aerial vehicle (UAV) to bolster Ukraine's combat against Russia-backed insurgents in the country's east [7].

The first batch of three drones was supplied to the Ukrainian Armed Forces, Ukrobonoprom said in a statement. The BpAK-MP-1 UAV was built by the firm's subsidiary Meridian in cooperation with a research team from the Kiev Technical University. «The path from the design phase to production was just one year,» the statement said.

Yuriy Paschenko, the deputy director general of Ukroboronprom, said that the tactical version of the new drone, which will be fitted with combat capabilities, will made in late 2016 and supplied to the Ukrainian Armed Forces in the first quarter of 2017 [9].

In 2015 the students of Kyiv Polytechnic Institute were created by unmanned aircraft complexes of the Spectator. Production of JSC established Meridian named S.P. Korolev, incorporated DC «Ukroboronprom» [3] . Also, to date the only UAV container start class micro, which passes the stage of flight and ground test is a UAV «Sokol-2», which is a joint development of the NTUU «KPI» and SE «DKKB», «Luch». An experimental sample of the UAV was presented to the largest in the Middle East and North Africa, the international exhibition of armaments and defence technologies «IDEX-2001» [3] and received the highest award in one of the seven nominations.

On the basis of the National Aviation University was created Center of unmanned aircraft «Virazh» [5], which is actively engaged in the development, tests and launch aircraft of different classifications. Among these BPS m-10-1 and m-10-2 «Eye», two-engine aircraft m-B5 «Sky Patrol», a multipurpose unmanned aerial complex m-6-3 «Skylark» etc.

Among domestic developer BpAK is worth noting [2, p. 38]: Institute of problems of physical modeling National Aerospace University «Kharkiv Aviation Institute», who created a series of BpAK with relatively high characteristics («Stork», «Snipe», «Peregrine Falcon», «Golden Eagle»); CB «Rise», LLC «Uavia» Chuhuyiv aircraft repair plant, RPI «Ukrtehno-Atom».

In January 2016 Secretary Oleksandr Turchynov stated about production shock unmanned vehicles at SE «Antonov» [6]. The main function of the new tactical Multipurpose unmanned air complex is intelligence. However, it will be able to carry a small combat load and hit the ground targets. In particular, it arms should be able to destroy heavy armor, for example, tank [6].

Conclusions

As a result of the research shows that the existing in Ukraine UAVS of different types largely reflect the concept of their operational use in the right situation, but there are still a number of issues that require fundamental research:

- theoretical-experimental search for optimal aerodynamics outline that best meets the geometric, massive and operational restrictions;
- improvement of efficiency coefficient of electric power installation the application of more efficient sources of electric energy;

- theoretical-experimental work on complete devices;
- implementation of the regulatory framework created, certification, registration and use of BpAK;
- creation of a system of technical support, repair and modernization of BpAK;
- deployment of a system of training of operators-pilots and engineering-technical composition;

Delineated areas solve problems require complex approach taking into account and using advanced achievements in the field of air crafting , newest technology, navigation and radio electronics.

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