
ANALYSIS OF COMMAND AND CONTROL MANNED AND UNMANNED AVIATION THROUGH COMBAT CO-EMPLOYMENT IN OPERATIONS

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Abstract. The article presents analysis and summarizes the existing methods of command and control manned and unmanned aviation through combat co-employment in operations based on practice of conduct military operations by Armed Forces of Ukraine and armed forces of the world’s leading countries. There are offered the ways command and control manned and unmanned aviation through combat co-employment further development.

I. INTRODUCTION

The development of technologies in the defense area has led to the rapid growth of the unmanned segment in the defense sector of the armed forces of the world’s leading countries and the expansion of their range. While the first unmanned aerial vehicles (UAV) were created (mainly) for reconnaissance, then in the future the range of their usage has expanded significantly (interference, retransmission, high-precision strikes on ground targets, air targets). This has led to the creation of unmanned aerial complex (systems) UAC(S) for different purposes. Currently, UAC(S)s can perform the same tasks as crewed aircrafts, and some of them even with greater efficiency and quality. With the development of modern communication and data transmission UAC(S) began to be used in conjunction with crewed aircrafts to aiming at the target, to relay command and control signals, to conduct electronic warfare, to defeat the elements of enemy’s air defense system etc.

Analysis of recent research and publications.

The sources [1, 2] are classified unmanned aerial vehicles, describing their main characteristics and purpose. The views on the further implementation of tactical techniques for combat co-employment of manned and unmanned aircraft are set out in [3]. The experience of combat co-employment UAVs as part of interspecies groups is considered in [4]. The possibility of combat co-employment of helicopters and UAVs is considered in [5]. In [6,7,8] the authors describe the experience of combat co-employment of attack aircraft and UAVs. The views on the further combat co-employment of manned and unmanned aircraft are described in [9].

II. METHODS OF COMMAND AND CONTROL MANNED AND UNMANNED AVIATION THROUGH COMBAT CO-EMPLOYMENT

During planning the combat co-employment of manned and unmanned aerial
vehicles, determining the method of control is one of the most important steps. The type of UAV, its functional purpose, avionics equipment of the crewed aircraft as well as the task will determine the methods and timing of information transfer from reconnaissance’s to strike unit, which will affect the method, procedure and timing of combat joint usage.

Combat experience shows, that the information transfer for command and control of combat co-employment was carried out in the following ways:

the first one – UAV - Operator (ground UAV command point) – ground (air) command point - aircraft (helicopter) with manual control of UAVs (this method was used during the Antiterrorist operation in eastern Ukraine in time of use of UAV “Race” and other small UAVs supplied by volunteers for the Armed Forces of Ukraine);

second one – UAV - Ground (air) command and control point - aircraft (helicopter) when flying UAVs in autonomous mode (war in the Persian Gulf in 1991, in most cases used known tactics: search on a given route, exit to a given point and its flight; flight of a given line [8]);

third one – UAV - Manned aircraft (online video broadcast to the crewed aircraft’s board) (during the combat actions in Kosovo in 1998-1999 a direct link was provided between the UAC in the air and a particular aircraft, aimed to launch a missile strike due to the inclusion of UAC in a common data exchange system based on air command posts, which became the basis of reconnaissance and strike systems [6]);

fourth one – Aircraft - UAV. Aircraft’s crew operates the UAV online using satellite data transmission. (Boeing and the US Navy conducted a series of successful test flights of two EA-18G Growler aircraft in unmanned mode, using a third manned EA-18G Growler to control them).

Analyzing the methods of information transmission, we can conclude that from the efficiency of information transmission and protection of the manned aircraft the most appropriate way to control the UAV - is from the manned aircraft. Nowadays, this method cannot be implemented in the Armed Forces of Ukraine due to the lack of technical capabilities (in particular, the lack of its own satellites and means of automating transmission of the data about situation on the air). Therefore, the most acceptable are the following methods of control during the combat joint usage of manned and unmanned aircraft:

the first – to command and control of manned and unmanned aerial vehicles is carried out from one (compatible) control point to which information from the UAV is received, processed and used to target and aim at the officers of the combat command and control crews of manned attack aircraft (helicopters). This reduces the time for searching and recognizing the target by the crew of the aircraft (helicopter);

the second – to command and control of manned and unmanned aerial vehicles is carried out from different control points, while the operator controls the UAV, brings it to the target area, searches and recognizes the object of impact and illuminates the target with a laser, which allows the pilot of the attack aircraft to quickly find the target and hit it with missiles or bombs with a laser guidance system.

The development of modern data transmission technologies gives impetus to the introduction of new methods of conduct combat operations. Existing UAC can provide information about enemy online to tactical aircraft, reducing aircraft crews’ time to search for and identify targets, which ultimately reduces the control cycle and, as a result, increases the effectiveness of combat employment.

III. CONCLUSIONS

World’s leading countries continue to introduce new methods of command and control, processing and issuance of data (material, graphic, video information), decision support management of various levels of decision makers, in order to
comprehensively ensure highly effective combat operations by modern multifunctional joint forces in a common information-communication space, which will be based on the formation of reconnaissance and combat information space in the combat zone, where the main elements that form it will be unmanned air vehicles for various purposes [4].

The armed forces of the world’s leading countries have and use some experience in the combat co-employment of manned and unmanned air vehicles to increase the effectiveness of combat operations in terms of reducing casualties among highly qualified aircrew. The world's leading scientists are working on the continuous improvement of aircraft with modern avionics, which allows to control combat operations, monitor the area of operation (battlefield) by receiving information online and constantly make adjustments to previously made decisions or refocus manned aircraft to ensure its safety.

Ukrainian Armed Forces are at the early stage of introducing combat operations of manned and unmanned aerial vehicles, but the armed confrontation in eastern Ukraine encourages military scientists to constantly search for new forms, methods and tactics of using existing weapons and military equipment (including more effective use of UAVs and manned aircraft), as well as their improvement, either on their own and in conjunction with experts from world’s leading countries (Turkey, USA, Israel, etc.).

References: