

### СЕКЦІЯ 3

## БЕЗПЕКА ФУНКЦІОНУВАННЯ ТЕЛЕКОМУНІКАЦІЙНИХ СИСТЕМ ТА МЕРЕЖ

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### CREATION OF AN EFFECTIVE RADIOLOCATION AREA FOR THE DETECTION OF UAVs

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The rapid development of unmanned aerial vehicles and their effective use is one of the main challenges for air defense systems. Timely detection of small-sized, relatively silent and low-altitude UAVs by air defense systems becomes difficult. In the development of UAVs, special colors and protective layers are used, which makes it difficult to detect them by visual observation posts or radiolocation stations [1-2].

From the analysis of the local wars and conflicts that have occurred in recent years, the Patriotic war that occurred in 2020, and also the ongoing Russia-Ukraine war, it was determined that in order to fight against UAVs, they must be detected in time. Due to the fact that the detection stations in the armament of the Armenian Army against the modern UAVs used by the Azerbaijani Army in the Patriotic War are old, the number of those stations is small, and as well as the weak combat skills of the personnel, they could not detect in time most of the UAVs used by the Azerbaijani Army. As a result of the correct combat tactics of Azerbaijan in the first days of the war, the locations of detection stations and anti-aircraft missile complexes in the armament of the Armenian Army were quickly discovered and neutralized. As a result, the air superiority in the Patriotic War completely went to Azerbaijan's side [3]. With the emergence of unmanned aerial vehicles, the problem of combating them has become significantly more relevant. After detecting and identifying UAVs by radiolocation stations, it is necessary to take measures to neutralize them. In order to combat UAVs more effectively, it is important to detect them quickly at a long distance as well as in a dead canyon [4].

One of the important factors is the method of formation of the battle position of RLSs for the detection of UAVs and the creation of an effective radiolocation area. The method of forming a battle position consists of several algorithms that include several interconnected stages. The algorithms are follows:

- battle position selection algorithm of RLS;
- algorithm for determining the number of visual observation posts equipped with an electro-optical system in the position area of the RLS;

-algorithm for choosing a rational variant of the battle positioning of RLS, taking into account the results obtained during the solution of the first two algorithms.

When choosing the battle positioning of radiolocation stations and placing them in positions, it is necessary to pay attention to the minimum dead canyon. The minimum dead canyon means that an effective radiolocation area has been created for detecting UAVs.

In this work, the algorithm for determining the number of visual observation posts equipped with an electro-optical system in the position area of the RLS for the detection of UAVs and the creation of an effective radiolocation area was considered.

Taking into account the characteristics of UAVs and the problems of combating them, it is advisable to equip visual observation posts with an automated electro-optical system for timely and effective detection of UAVs in the dead canyon. The use of existing and promising electro-optical systems in the direction of the likely flight of the enemy and in visual observation posts (VOPs) allows timely detection of UAVs in the dead valley, recognition of their class, type and current nature of their movements.

In the future, the mentioned electro-optical systems can be replaced by more improved models. Thus, examples of electro-optical systems have already been developed and can detect UAVs in time. In order to effectively detect UAVs in a dead canyon, when creating a radiolocation area, it is necessary to pay attention to the combat positioning of radiolocation stations, the number of visual observation posts (VOP) equipped with an electro-optical system, and how to place them in the area. As a result, it can be noted that taking into account the viewing angle, the detection distance of the electro-optical system placed on the visual observation post, the direction relatively to the central axis of the RLS, the angle of the dead canyon of the RLS, the height at which the UAV can enter the RLS dead canyon, the number and distance of the electro-optical system for the detection of UAV, it is possible to detect UAVs in the dead canyon through an electro-optical system placed to the visual observation post.

### **References**

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