Research on The Operational Effectiveness of Air to Ground Missile Based on The Detection Parameters

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Abstract: Air to ground missile is the first weapons to attack, and due to its operational effectiveness and the quality of the air to ground missile is particularly important. This paper through the air to ground missile tactical performance indexes, data detection analysis, extracted factors from air to ground missile optimization assessment which should be considered, as formulated in the air to ground missile optimization evaluation index based.

Keywords: detection parameters; air to ground missile; operational effectiveness

Introduction

Nowadays the detection quality of the missile is only qualified or unqualified, with the missile shooting at the target before the selection, and need to make reasonable analysis of shooting results, we need to analyze each part, especially the detection of the parameters of the key components[1][2]. But at home the analysis of the missile has not been generally accepted by the evaluation index of effective and authoritative ranking method. This has resulted in the need for the selection of missile combat environment when there is no basis phenomenon. To achieve the effect of security, have a detailed study of various performance parameters of the missile, analyzed the objective quality of the missile and get to scientific election bomb.

1 Missile Test Parameters

The combat effectiveness of air to ground missile depends on the function of each component of missile normal play, and these components at run time, affected with a variety of external factors, various factors for the following detailed analysis of the impact of air to ground missile, as the development of air to ground guided bomb optimization evaluation index on the basis.

1.1Seeker System Related Parameters

TV seeker mainly have three key performance indicators: line of sight angle speed precision, stable platform isolation, optical axis open-loop drift. Other indicators for general index. Seeker angular speed of the line of sight of high precision, stable platform isolation degree and axis open-loop small drift, improve the missile accuracy. Seeker of typical buildings) detection, identification, tracking performance of the main influence factors have visibility, illumination and other environmental factors.

1.2 Control and Navigation System Parameters

Control and navigation system has eight key performance indicators: the integrated navigation system of heading angle / attitude angle precision navigation system navigation accuracy, air tightness of air data system, height accuracy of air data system, the sensitivity of the radio altimeter, radio altimeter altimetry precision actuator, the maximum output torque and servo band. Other indicators for general index. Under the same conditions, the integrated navigation system of heading angle / attitude angle with high accuracy, high precision of integrated navigation system, air data system has good air tightness, high precision, high accuracy of radio altimeter altimetry, contribute to the missile at a predetermined flight route planning, improve the hitting accuracy of the missile. The sensitivity of the radio altimeter the high elevation range is larger, the range of indicators can meet the requirements.

1.3 Image / Instruction Transmission System Related Parameters

Image / instruction transmission system are two key performance indicators: image transmission device can transmit power, command receiving device sensitivity. Other indicators for general index. Under the same conditions, image transmission device to transmit power, command receiving device has the advantages of high sensitivity, to improve the effective distance of image / instruction transmission system, the system margin and anti-jamming performance.

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1.4 Power System Related Parameters

Dynamical systems, mainly in two key performance indicators: engine thrust, fuel consumption rate. Other indicators for general function index. Engine thrust directly affect the engine can for the missile provides enough power, so that the stability of missile flight, engine fuel consumption affects missile can meet the shooting process requirements.

2 Typical Targets and Environmental Conditions

TV seeker for visible light imaging system, and the outside world is closely related to weather conditions, only visibility cannot determine the guided seeker role distance guide seeker distance but also consider the target size, the contrast of target and background, outside light conditions (illumination), flight course.

1)Typical targets: ground command and communication center, bridge, technical weapon positions, (semi) permanent underground works, port terminals, transportation hubs, and ships parked.

2) Environmental requirements: during the day, sunny, cloudy or cloudy. There are clouds, cloud base height is higher than 1500m.

3) Flight course requirements: in the task planning in terminal trajectory seeker boot point and target point connection direction as far as possible fairing or side fairing using seeker in fairing or side fairing) conditions, the goal is usually white, target and background contrast can be significantly improved, is conducive to the pilots of the target lock and seeker of target tracking; secondly is the backlight seeker, try to avoid in the backlight using seeker, because in the backlight and backlight conditions, the goal is usually black, will reduce the target and background contrast, also in the search easily in the Fig.1 formed on the spot, not suitable for use, Fig.1as follows:

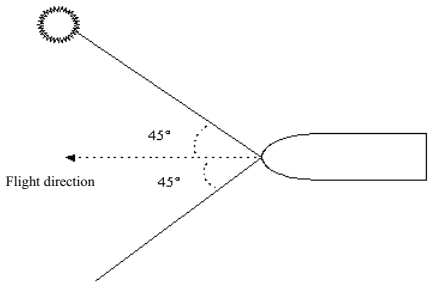

Fig.1 requirements of missile flight direction

4) Contrast requirements: TV seeker by gray television imaging system, background images of the target is generally dark gray, the target image and background image has certain difference, this is TV guide the inherent characteristics of homing guidance missile.

5) Air to ground missile image and command transmission system using microwave wireless communication of TV missile image and catching and command transmission. According to the image / instruction transmission system anti-interference ability and may encounter interference pattern to determine the missile using can avoid unnecessary losses in the war, and achieve optimal missile using effect.

3 Usage scenario

Missile penetration ability is an important factor to determine its effectiveness. The penetration ability of the missile is mainly reflected in the following aspects:

1) Formation

Ensure 8 aircraft with a certain missile in the same airspace in the same time to implement the attack:

(1) 8 plane formation (composed of two machine 4 wedge team): elevation 1 vertical interval of 1 of our knowledge of our knowledge;; the horizontal interval of 5 of our knowledge;

(2) 4 wedge: interval 400m; height 50m.

2) Routes planning

Each aircraft can be planned 4 goals, each target corresponds to 3 routes, the target and route choice can be automatically loaded, you can manually load through the pilot in the Fig.2 .

3) Lateral planning

To avoid the threat of lateral route planning. If the missile with lateral route planning, an acute angle between the adjacent segment of should is less than or equal to 25 degrees, and different leg lengths on the corner is limited, therefore, planning, should pay attention to try to plan smaller leg corner. If there is a war zone information map, according to the actual situation, choose reasonable emission area to avoid the threat.

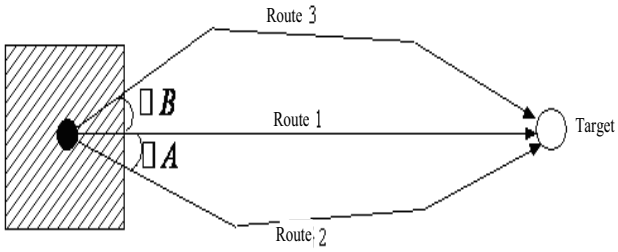

Fig.2 routes planning

4) Zooming

Missile terminal can achieve leap or not jumped two ballistic. Select terminal trajectory for jumps and requirements at the end waypoint height and the height of the target is less than equal to 350m and effective range is less than or equal to 110km. for (semi) permanent underground fortifications, airport runway, bridge deck planar targets and aircraft shelters, fixed radar bunkers target, it is recommended by terminal "zooming" effective attack.

5) Low altitude penetration Certain air to ground missile minimum flight altitude of up to 50m, against the established operational environment of the typical target.

4 Summary

This paper searches the detection parameters of the system composed of a certain type of air to ground missiles each. Analysis, the influences of the parameters, for each system to make a detailed and objective evaluation. According to the type of air to ground missile detection parameters, the type of air to ground missile quality and combat training effect as the research target, for the analysis of the quality of the air to ground missile provides the theoretical basis.

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