A Brief Discussion on The Development Trend of Precision Guided Weapons

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Abstract

In the modern battlefield, precision guided weapons have become an indispensable weapon. In the Iraq war, the proportion of American precision guided weapons has accounted for 68%, and in recent years, the major countries of the world have paid great attention to the investment in the research and production of precision guided weapons, especially in the late twentieth Century and early twenty-first Century, with the continuous improvement of the level of science and technology, the tactics of precision guided weapons. With the continuous improvement of technical performance and the emergence of some new precision guided weapons, it affects the mode of future information warfare. Therefore, it is of great significance to explore the development trend of the future precision guided weapons for the initiative of information warfare.

Keywords

Discussion; precision;guided weapons;development trend.

1. The overview of precision guided weapons

In the Gulf War, the ground forces of both sides not only used ground to ground missiles, ground to air missiles, anti tank missiles, but also the sea and air force of the multinational force also used air to ground missiles and cruise missiles. After the war, countries had to start thinking about the great role of precision guided weapons. So what exactly is precision guided weapons? The following are three aspects:

1.1 The concept of precision guided weapons

The so-called precision guided weapons are the general name of guided weapons, such as missile, guided projectile, guided torpedo and so on, with high precision (probability), and mainly refers to the high precision campaign and Tactical Guidance Weapon of non nuclear warhead. Here, "precision" is a relative concept. At present, there is no unified understanding at home and abroad, but the more representative view is that the guided weapon whose direct hit probability is higher than 50% can be called precision guided weapon. This probability is generally described by the circular probability error (CEP). The smaller the circle probability error is, the higher the precision of the weapon's hit, which is the primary consideration of the world's main countries in developing the precision guided weapons. For example, the CEP value of the US "battle axe" to land attack cruise missiles is 9 meters, meaning that if 100 such missiles are launched, at least 50 have fallen into a circle with a target centered and a radius of 9 meters.

1.2 Characteristics of precision guided weapons

Compared with non-guided weapons, precision guided weapons have many outstanding advantages, such as high precision, high efficiency, long range, high technology and great power.

1.The precision of hit is high. The probability of the precision guided weapon to hit the target can reach more than 50%. The minimum round probability error of the point target can be within 0.9 meters, and the minimum error of the circular probability can be less than 1 meters. In the Gulf War, for example, two American planes took off from the aircraft carrier Kennedy and were ordered to bomb a hydropower station in Iraq. The A-6E attack aircraft flew to the target 100 kilometers from the target, launching a "slam" missile, which was controlled by A-7E, hit the protective outer layer of the hydropower station and exploded a hole nearly 10 meters in diameter; 2 minutes later, the A-6E launched second missiles. The destruction of the internal facilities of the hydroelectric power station is overwhelming.

2. The combat effectiveness is high. Although precision guided weapons are complex in technology and high in R & D costs, the efficiency ratio that it brings is immeasurable, and a missile can often destroy a hundred times more expensive weapons than it is, and high precision guidance ensures the efficiency of precision guided weapons. In the Kosovo war, the Southern Alliance against the air force, the "Sam" -3 ground to air missile, shot down a $more than 100 million F-117 stealth fighter bomber.

3. Remote operational capability.This feature can be said to be obvious.For tanks, the range of large and medium-sized tank guns is generally 2-3 kilometers.The range of the anti tank missile can reach about 10 kilometers.There are also some intercontinental ballistic missiles, which range even tens of thousands of kilometers, which can basically cover any country in the world.

4. Righ end R & D technology. The most important of the precision guided weapons is the guidance and control system, which directly determines its guidance precision. Therefore, it is based on the high-end technology and integrates modern science and technology to achieve its ability to strike accurately.

5. The damage is great. For example, a tactical conventional missile, if carried with 1 tons of heavy combat charge, is equivalent to the power of the 18 artillery firing in Qi, while a thousand tons of small nuclear bombs are equivalent to 10 of the 1 rounds of 540 artillery guns in 10 artillery regiments.

1.3 The role of precision guided weapons

The role of precision guided weapons can be described in two sentences: "it is the pioneer force in the battlefield". In the past few years, the local war can be seen that precision guided weapons have become the most important equipment used, mainly to destroy important targets and military facilities, to achieve certain tactical goals, and to make the follow-up troops capable of fighting on the ground. For example, in the war in Iraq, in the first five days of the war, the United States Navy launched 216 Tomahawk cruise missiles, attacking important military targets, such as the Iraqi defense department, the presidential palace, the communications command center and so on. Various Air Force fighters launch 600 HARM anti radiation missiles, which are used to destroy the Iraqi air defense system alert radar, fire control, guidance radar and the C (U3) I system. The two is "it's a sniper in the battlefield". As long as the precision guided weapon detects and finds the target, the target must not escape its pursuit, and to a large extent, makes it lose combat effectiveness. For example, Israel's "strange snake" claims to be the world's first "aiming hit" air-to-air missile.

2. The present situation of the development of foreign precision guided weapons

Since 1950s, the development of precision guided weapons is very rapid, especially in the United States, Russia and some European countries, most of the precision guided weapons have developed to the third generation, and the individual varieties have developed to the fourth generation. Below is the introduction of some foreign equipment.

"Haier Fa" missile is the third generation of heavy long-range anti-tank missile in the United States. It has formed a series, mainly AGM-114A/B/K/D/L/N and other types. The "Hai Fa" adopts modular design, which can be used for one bullet, one head and one bomb. At present, the United States is developing a JCM joint universal missile. The biggest selling point of the joint universal missile is

its versatility. It is a multi - military, multi - user, multi - platform missile. It is not only applicable to the main near range firepower support platform of the United States' three army and the recent development of the United States, but also with most of NATO's similar weapons. Platform compatibility; not only suitable for slow rotor aircraft and fast fixed-wing aircraft, but also can be equipped to tank vehicles and ships.

"Short" is a Russian light third generation anti tank missile, mainly used to attack the main tank outside the range of tank guns, and can also be used to attack other armored targets, such as armored vehicles and fields, buildings, and other non armored targets, as well as anti personnel. Compared with other more advanced antitank missiles in the world, "short" anti tank missiles have excellent performance and have many unique advantages: first, the missile is easy to use and is not maintained. Secondly, compared with the "launch without tube" missile, which is widely used in western countries, the "short" anti tank missile adopts the "see and see" launch mode and the laser beam driving guidance mode, which can ensure that the missile exerts power at the maximum range. Third, the anti jamming capability of "short" anti tank missile is better.

The meteor missile developed by six European countries is a fast and highly maneuverable oth air to air weapon. Guided by active radar seeker, the missile can automatically attack air targets in all weather conditions and electronic warfare environment. The "meteor" missile has a long range of range and high killing ability, which can be equipped with near frying fuze or trigger fuze to ensure that the target can be damaged effectively in various environments.

3. The development trend of future precision guided weapons

The future information battlefield has the characteristics of wide battle field, wide front, long length and so on. The war mode has become a fierce confrontation between the weapon equipment system and the system from the development of the confrontation between the single weapon and equipment. As an important operational tool in the information field, precision guided weapons will be an important pillar in the future war. Therefore, the major countries of the world will invest more human resources in the research and improvement of the precision guided weapons, and the precision guided weapons will also become the focus of the research of military technology in various countries. Looking back at the current state of weaponry in various countries, precision guided weapons will show the following trends:

3.1 The development of human - machine intelligence to improve the precision of hit.

The greatest advantage of precision guided weapons is that it can hit the target with high precision. It usually receives the position parameters of the target to track the target with the assistance of the detection device, until the target is hit. In this process, the human factors do not fully play out, and the future battlefield needs people and weapons and equipment together, further improve the hit probability, to meet the needs of the future high-tech local war. It is believed that because the ground background is relatively complex and the automatic target recognition technology is not mature, it is difficult to give full play to the operational effectiveness of missile weapons in the ground operations. For this reason, the United States continues to intensify its research on automatic target recognition technology. Vigorously develop "people in the loop control" technology, through the manual participation to observe, select, lock the target, and then turn into the missile to automatically track, or direct control of the missile attack targets.

3.2 The use of multi-purpose / multi platform weapon systems improves the versatility of precision guided weapons.

Multipurpose / multi-platform refers to the use of "one kind of operational platform to carry and equip a variety of functions of precision guided weapons" or "one kind of precision guided weapons at the same time carrying or equipping a variety of different forms of combat platform." Obviously, such a weapon system not only improves the versatility and versatility of the precision guided weapon itself, but also improves the integrated operational capability of the operational platform (aircraft, warship,

etc.), and forms an effective attack and defense system. The improvement of general performance will inevitably bring about the advantages of the cost of precision guided weapons and the reduction of maintenance difficulty. These are all factors affecting the tactical and technical indicators of guided weapons. Therefore, the use of this multi-purpose and multi platform weapon system will certainly be a major trend of the development of precision guided weapons in the future information warfare.

3.3 Use stealth technology to improve penetration capability and battlefield survivability.

The emergence of precision guided weapons will inevitably bring about the development of anti guidance technology. After the 9.11 event, the United States has stepped up its native missile defense system, mainly to prevent similar events, especially the raids of remote guided weapons. Then the precision guided weapon will find another way to improve its penetration capability or survivability in the battlefield. At present, foreign stealth technology is becoming more and more perfect in theoretical basic research and application research, and stealth technology has been successfully applied to weapons and equipment, and will be gradually used on remote precision guided weapons to improve their penetration ability and battlefield survivability. For example, in order to enhance the stealth of the missile, the invisible long-range air to air missile composite material consists of its outer layer, which can absorb the infrared of the missile and is not easily found by the opponent. Through the comprehensive use of radar, infrared and acoustic stealth technology, the radar reflection cross section, infrared signal features and noise will be further reduced in the future, making the defense system more difficult to detect and track the missile, and the penetration and battlefield survivability of the missile will be greatly improved.

3.4 We must enhance the capability of long-range strike so as to achieve dual development of fire and range.

One is to improve the range of weapons. In the future, the depth of the battlefield will be further increased in the local war. In order to achieve its long range Strike ability and complete the operational task, the guided weapon will also increase the range of the range to the tactical purpose of the future war. In the first World War, the depth of the first World War was only tens of kilometers, and the World War II increased to hundreds of kilometers. In order to meet the needs of the future high-tech local war, the United States brought the depth of 3500 kilometers into the scope of the war zone, which prompted the rapid development of precision guided weapons to the direction of remote. Two is to improve the killing of weapons. Guided weapons must seek to improve their lethality when they reach high hit accuracy, which is very important in the battlefield. A guided torpedo can destroy a warship. It does not only hit a hit, but also the huge firepower that brings after the hit. This performance is the ability to eliminate the enemy's weaponry.

4. Conclusion

Precision guided weapons also have great potential in anti-jamming capability, serialization, modularization and anti guidance capabilities. This will inevitably bring about a technical competition in various countries to adapt to the survival value of precision guided weapons in the future battlefield. In the coming years, countries will continue to invest more in precision-guided weapons to improve their integrated military capabilities.