Advances in Aerospace Science and Applications.
ISSN 2277-3223 Volume 3, Number 2 (2013), pp. 35-40

http://www.ripublication.com/aasa.htm

Aquatic – Air Borne Fighter

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Abstract

Today the aerospace industry has grown to great heights with advancements in various technologies not only launching a spacecraft from the earth's surface but also extends to various technology involving in space propulsion.Can the fighter passes through water? Missiles having both capability of travelling inside the water and air. We are going to apply the same principle of missile and this can be operated as amphibian fighter named as Aquatic - Air Bourne Fighter. It has two methods to produce thrust. Inside the water, it is propelled by motor, when it comes out of the water the combustion system will start and boost the fighter in air. It uses stealth technology to escape from the radar. As we all known that any missile goes from denser medium (water) to rarer medium (air) will increase the speed suddenly. So that it can destroy the target from water to air and vice versa.

Keywords: Aerospace; Missiles; Amphibian; Fighter; combustion system; propeller; radar.

1. Introduction

The current technology is working well in advance and finding innovative in the battle field and for surveillance purpose. The other technology amphibian is one in which fighting is possible in both land and water. But we need to focus only on air. The main idea is to implement amphibian with stealth technology in a fighter aircraft. "It is possible to do or die with a great fall". Each and every country is spending lot of money for strengthening their nation. It means they have to be more secured than any other country. If someone designing a new weapon is the concept of others. It means

even a concept cannot be kept secret and safe. The one and only reason for all those things is nothing but the stealth technology. The combination of stealth in an amphibian fighter aircraft, we named as aquatic – air borne fighter. As we all known that aquatic is water and air borne where the challenging task is going to our fighter aircraft. In the battle field the things happening which are unpredictable and leads to a huge disaster. Our responsibilities sober us; our adversities strengthen us.

2. Sections

2.1 The Basic Concept in Aquatic- Air Born Fighter: (Stealth technology, Hybrid Engine)

Continuous developments in military aircraft technology have produced a new sort of defensive weapon: Stealth. Planes can now fly invisibly into enemy airspace, drop a payload, and fly back out without being detected, identified or attacked. To meet this goal, an aircraft must be "stealthy" in many areas. It must be very hard to detect on radar. The hot emissions from the engines must be minimal. It must be quiet. It's engines should not produce contrails or exhaust smoke in cold atmosphere. It should be hard to see with the human eye. Stealth aircraft are designed to avoid detection using a variety of advanced technologies that reduce reflection/emission of radar, infrared, visible light, radio-frequency (RF), spectrum, and audio frequency (AF).

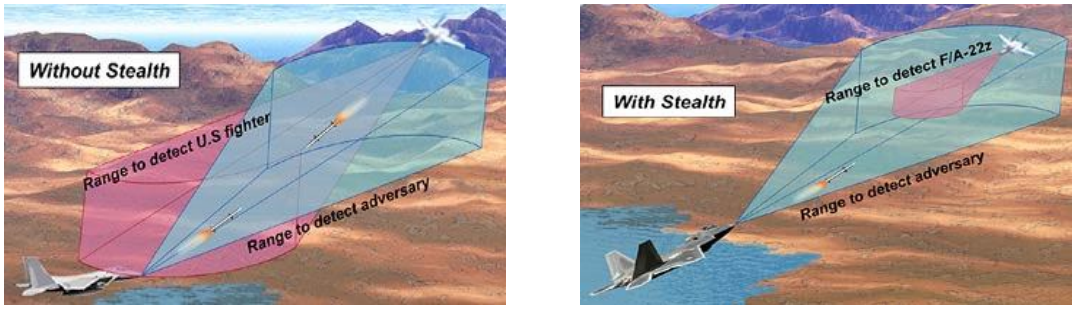

Figure 1: Advantages of Stealth coated Aircraft.

Stealth has become the magic word in contemporary weapon systems. Contemporary work on stealth has its roots in long-standing efforts to reduce the visibility of military aircraft through camouflage paint schemes. However, as electronic sensors have replaced the eyes of pilots as the primary means of tracking other aircraft, more intricate means of defense were needed.Often thought of simply as the use of special materials to render aircraft invisible to radar, stealth is actually a complex design philosophy to reduce the ability of an opponent's sensors to detect, track and attack an aircraft (or other platforms such as warships). Since a variety of sensors would be used in this process, design of a stealth vehicle requires careful trade-offs among different techniques. The great secrecy surrounding stealth programs is

designed not simply to protect a particular stealth technology, as it is to protect the choice and mix of techniques that have been used in a specific system.

3. Eagles Among Sparrows:

The new generation of American combat aircraft, including the F-117A, YF-22, the A-12 and the B-2, are all characterized by stealth features unmatched by the aircraft of other countries. While these new systems may provide some operational advantages, they have not rendered all other aircraft obsolete. Stealth is by not means a prerequisite for delivery ordnance on target, since as previously discussed, the performance of air defence systems against more conventional attack aircraft still leaves much to be desired. Nor should stealth be regarded as the final move in the game of electronic countermeasures, given the variety of design and operational constraints imposed by stealth. Finally, all the American stealth projects face serious budget problems, and their future is far from assured.

The F-22 provides "first-look, first-shot, first-kill" transformational air dominance capability for the 21st Century - it can see the enemy first while avoiding detection itself.

When we meet the enemy, we want to win 100-0, not 51-49. The F-22 will be able to get to the fight faster and engage the enemy longer. Parity or inferiority in air dominance is unacceptable; either one means more friendly casualties and a longer, more uncertain campaign. The American people do not want an even match; they want decisive, overwhelming superiority and minimum casualties with no protracted conflict. Downsizing U.S. forces means that in future conflicts, at least initially, we are likely to fight outnumbered – making the revolutionary capabilities of the F-22 essential for national security.

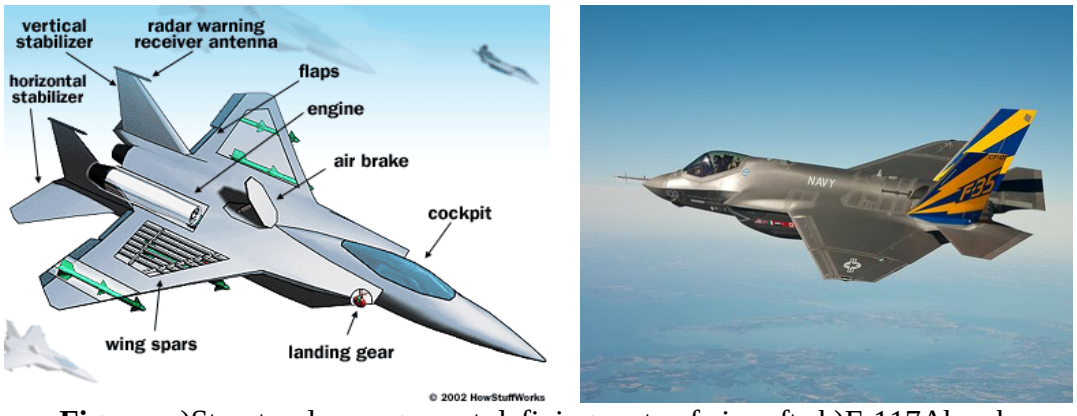

Figure: a)Structural arrangement defining parts of aircrafts b)F-117Ahawk

4. General Design:

The general design of a stealth aircraft is always aimed at reducing radar and thermal detection. It is the designer's top priority to satisfy the following conditions; some of which are listed below, by using their skills, which ultimately decides the success of the aircraft:- Reducing thermal emission from thrust. Reducing radar detection by altering some general configuration (like introducing the split rudder).Reducing radar detection when the aircraft opens its weapons bay. Reducing infra-red and radar detection during adverse weather conditions.

4.1 Instability of design:

Early stealth aircraft were designed with a focus on minimal radar cross section (RCS) rather than aerodynamic performance. Highly-stealth aircraft like the F-117 Nighthawk are aerodynamically unstable in all three axes and require constant flight corrections from a fly-by-wire (FBW) flight system to maintain controlled flight. Most modern non-stealth fighter aircraft are unstable on one or two axes only. However, in the pursuit of increased maneuverability, most 4th and 5th-generation fighter aircraft are designed with some degree of inherent instability that must be controlled by fly-by-wire computers.

4.2 Aerodynamic limitations:

Earlier stealth aircraft (such as the F-117 and B-2) lack afterburners, because the hot exhaust would increase their infrared footprint, and breaking the sound barrier would produce an obvious sonic boom, as well as surface heating of the aircraft skin which also increased the infrared footprint. As a result their performance in air combat maneuvering required in a dogfight would never match that of a dedicated fighter aircraft. This was unimportant in the case of these two aircraft since both were designed to be bombers. More recent design techniques allow for stealthy designs such as the F-22 without compromising aerodynamic performance. Newer stealth aircraft, like the F-22, F-35 and the Sukhoi T-50 have performance characteristics that meet or exceed those of current front-line jet fighters due to advances in other technologies such as flight control systems, engines, airframe construction and materials.

4.3 Radar stealth countermeasures and limitations:

Low frequency radar

Shaping does not offer stealth advantages against low-frequency radar. If the radar wavelength is roughly twice the size of the target, a half-wave resonance effect can still generate a significant return. However, low-frequency radar is limited by lack of available frequencies which are heavily used by other systems, lack of accuracy given the long wavelength, and by the radar's size, making it difficult to transport. A long-wave radar may detect a target and roughly locate it, but not identify it, and the location information lacks sufficient weapon targeting accuracy. Noise poses another problem, but that can be efficiently addressed using modern computer technology; It

has been said that "there's nothing invisible in the radar frequency range below 2 GHz".

4.4 Amphibian fighter under submarine system

Hybrid engine is the best way for this aquatic – air borne fighter. It has two methods to produce thrust. It consists of two types of engines. They are propeller engine and turbine engine. Propeller rotation pushes the fighter forward by means of supercavitation principle and when it comes out of water surface it is switched automatically to run the turbine and propeller stops working. Diesel submarine is a very good example of a hybrid vehicle. Most diesel submarine have two or more diesel engines.

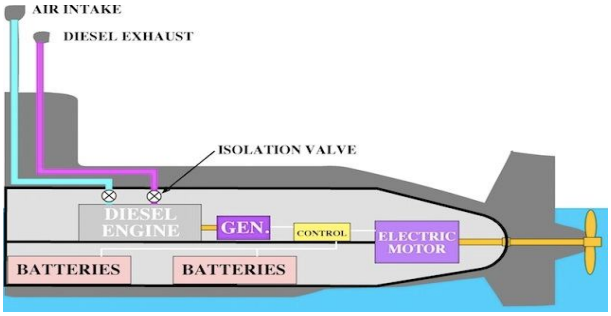

Figure 1: Concept of submarine's interior engine design.

The diesels can run propellers or they can run generators that recharge a very large battery bank. They can also work in combination, one engine driving a propeller and the other driving a generator. The sub must surface to run the diesel engines. Once the batteries are fully charged, the sub can head. The batteries power electric motors that drive the propellers. Battery operation is the only way a diesel sub can actually submerge. The limits of battery technology severely constrain the amount of time a diesel sub can stay underwater. This is the huge benefit of using nuclear power in a sub. Nuclear generators need no oxygen, so a nuclear sub can stay underwater for weeks at a time.

5. Conclusion

Though various leading technologies are in the defence field, "stealth technology plays a vital role". Application of stealth coating makes the aircraft to invisible. It is possible to design a aquatic – air borne fighter with stealth technology and we can use this fighter for surveillance as well as fighting purpose at faster rate. It can vanish the target from underwater to air and vice versa. It can do all the maneuvers that other fighters cannot. Fighting is not only the solution for all problems, but for safer side we should have some shield to protect us!!

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