DESIGN AND FABRICATION OF STEALTH UAV INSTEAD OF CLARK Y TYPE AEROFOIL WINGTIP

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Abstract

The use of Unmanned Aerial Vehicles (UAVs) in military surveillance operations has become increasingly popular in recent years. The development of Stealth UAVs has provided a new dimension to military surveillance, enabling operators to conduct covert operations without being detected. The aim of this paper is to explore the design, development, and applications of Stealth UAVs for military surveillance. The paper discusses the various features and technologies of Stealth UAVs. Finally, the paper examines some of the ethical and legal issues surrounding the use of Stealth UAVs in military operations, Overall, the paper concludes that Stealth UAVs have the potential to revolutionize military surveillance operations, providing operators with a powerful new tool for gathering intelligence and conducting covert operations.

Introduction

Stealth Unmanned Aerial Vehicles (UAVs) are a type of unmanned aerial vehicle designed to be undetectable by radar and other detection technologies. The history of Stealth UAVs can be traced back to the development of the first unmanned reconnaissance aircraft in the early 1960s. These early UAVs were designed to gather intelligence on enemy forces and were primarily used for surveillance and reconnaissance missions.The development of Stealth UAVs began in the 1980s with the introduction of advanced materials and coatings that made aircraft less visible to radar and other detection technologies.

The first Stealth UAV was the Lockheed Martin RQ-3 Dark Star, which was designed for long-range surveillance missions and made its first flight in 1996. The Dark Star was built with advanced composites and featured a low-observable design that made it difficult to detect by radar. Another early Stealth UAV was the Boeing X-45A, which was developed in the early 2000s and made its first flight in 2002.

The X-45A was designed for use in combat operations and was capable of carrying weapons. It was built with advanced materials and coatings that made it less visible to radar and was equipped with advanced sensor technology that allowed it to gather intelligence on enemy forces.

Today, Stealth UAVs are used extensively in military operations around the world, providing operators with a powerful new tool for gathering intelligence and conducting covert operations. They are designed with advanced materials and coatings, low-observable features, and advanced sensor technology that make them undetectable by radar and other detection technologies. Despite their advantages, the use of Stealth UAVs in military operations raises ethical and legal issues that must be carefully considered.

Principles

Stealth technology (or LO for low observability) is not one technology. It is a set of technologies, used in combinations, that can greatly reduce the distances at which a person or vehicle can be detected; more so radar cross-section reductions, but also acoustic, thermal, and other aspects.

PRELIMINARY DESIGN PHASE

The design configuration arrived at in the conceptual design phase is then tweaked and remodeled to fit into the design parameters. Major structural and control analysis is also carried out in this phase. Aerodynamic flaws and structural instabilities if any are corrected and the final design is drawn and finalized.

Then after the finalization of the design lies the key decision with the manufacturer or individual designing it whether to actually go ahead with the production of the aircraft. At this point several designs, though perfectly capable of flight and performance, might have been opted out of production due to their being economically nonviable.

DETAIL DESIGN PHASE

This phase simply deals with the fabrication aspect of the aircraft to be manufactured. It determines the number, design and location of ribs, spars, sections and other structural elements. All aerodynamic, structural, propulsion, control and performance aspects have already been covered in the preliminary design phase and only the manufacturing remains. Flight simulators for aircraft are also developed at this stage.

STRUCTURAL FITTINGS AND CONNECTION STUDY

BOLTS

General requirements of repair, maintenance and storage are of four main units such as fittings, bolts, rivets, welds. No doubt that main or primary fitting involves more weight and cost per unit volume than any other parts of aerospace structure.

AIRCRAFT BOLTS:

Bolts are used to transfer relatively large shear or tension loads from one structure to another. Hexagon head bolts is Army-Navy bolt made from SAE 2330-3.5% m steel

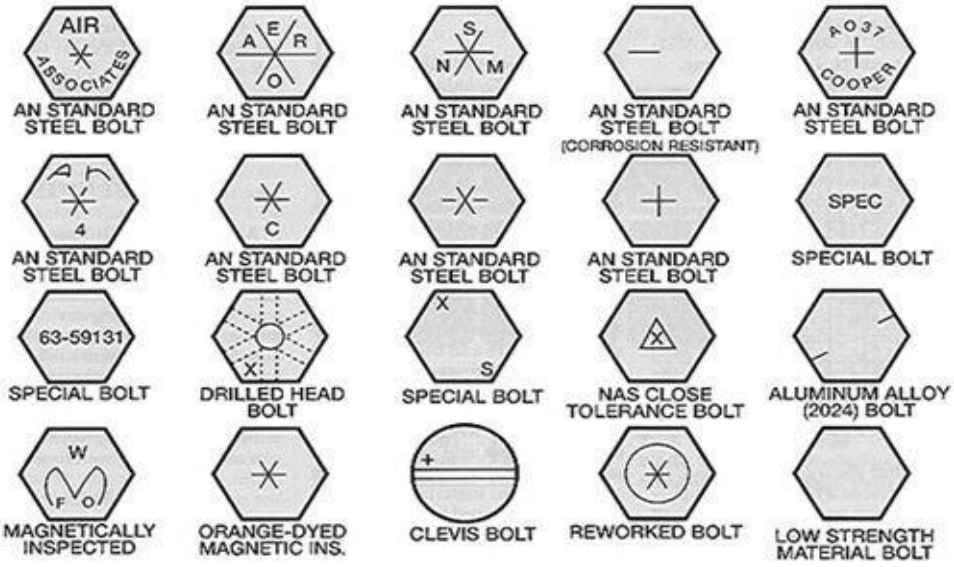

Fig. 1) ARCRAFT BOLTS

NUTS

Nut material should be more ductile than bolts material, thus when nut is tightened the thread will deflect to seat on the bolt thread. It develops the max strength of the bolts. Bolts threads should not be placed on the shear or Bearing. The length of the bolt shank should be not more than thread below surface fitting

There are four types of nuts they are,

- Castel Nuts
- Shear Nuts
- Plain Nuts
- Self-locking Nuts

Fig.2) AIRCRAFTS NUTS

THREE VIEW DIAGRAMS OF AIRCRAFT

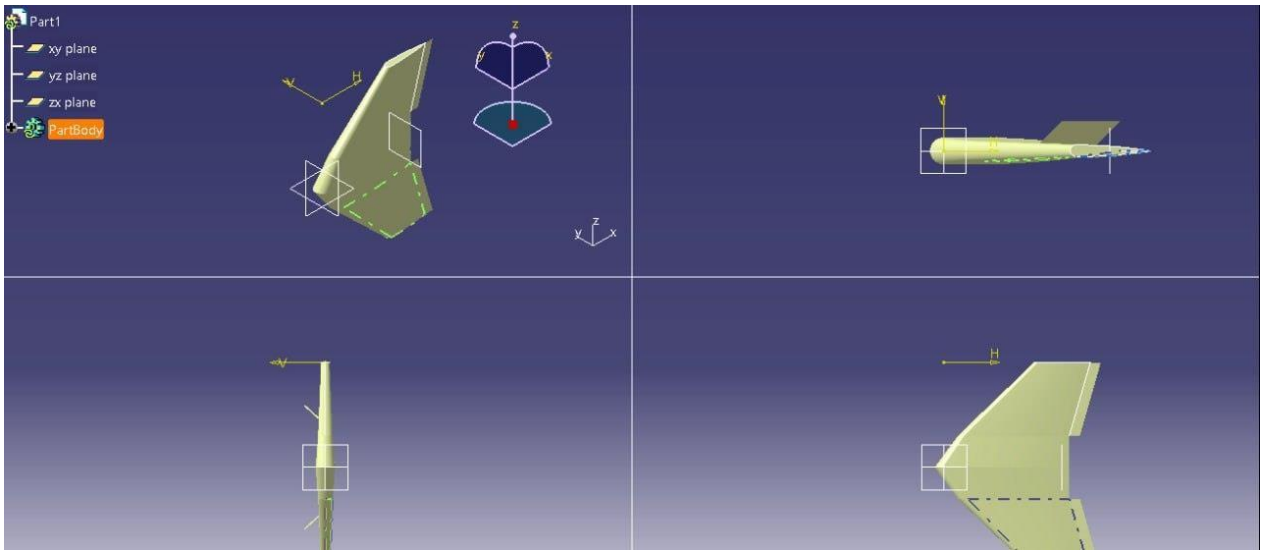

Fig.3) 3D VIEW

2D VIEW OF THE AIRCRAFT

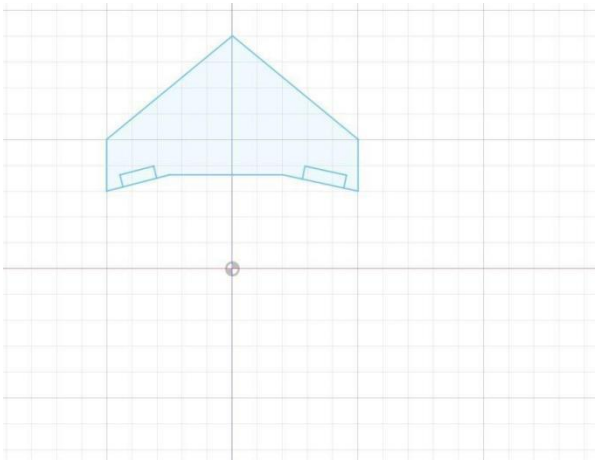

Fig. 4) Top view of UAV

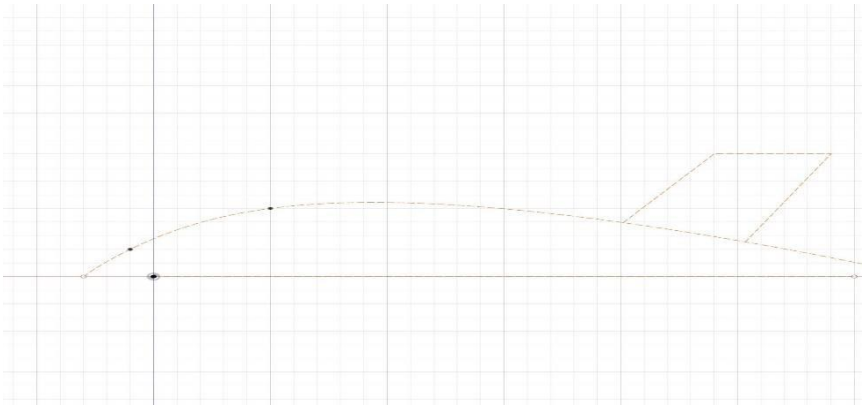

Fig.5) Side view of UAV

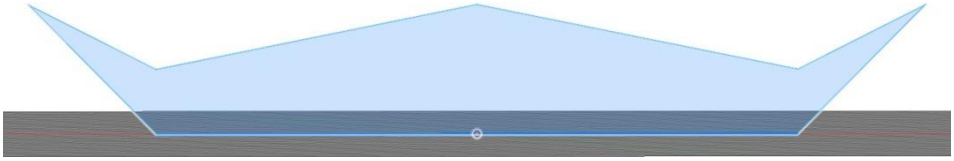

Fig. 6) Front view of UAV

SELECTION OF AIRFOIL

I have chosen N-9 high speed airfoil for my project

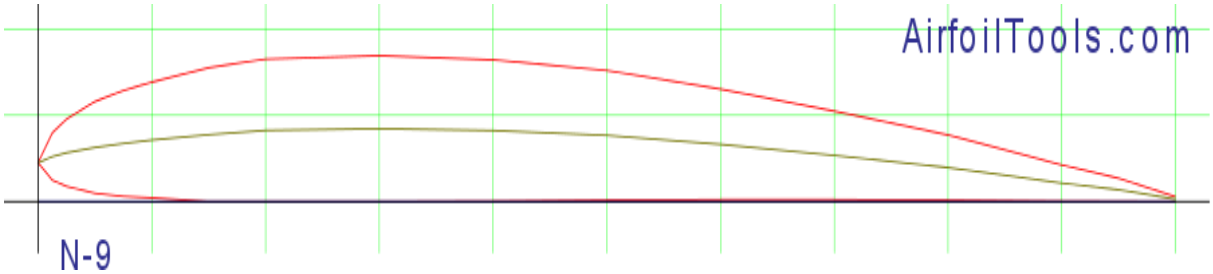

Fig.7) SELECTION OF AIRFOIL

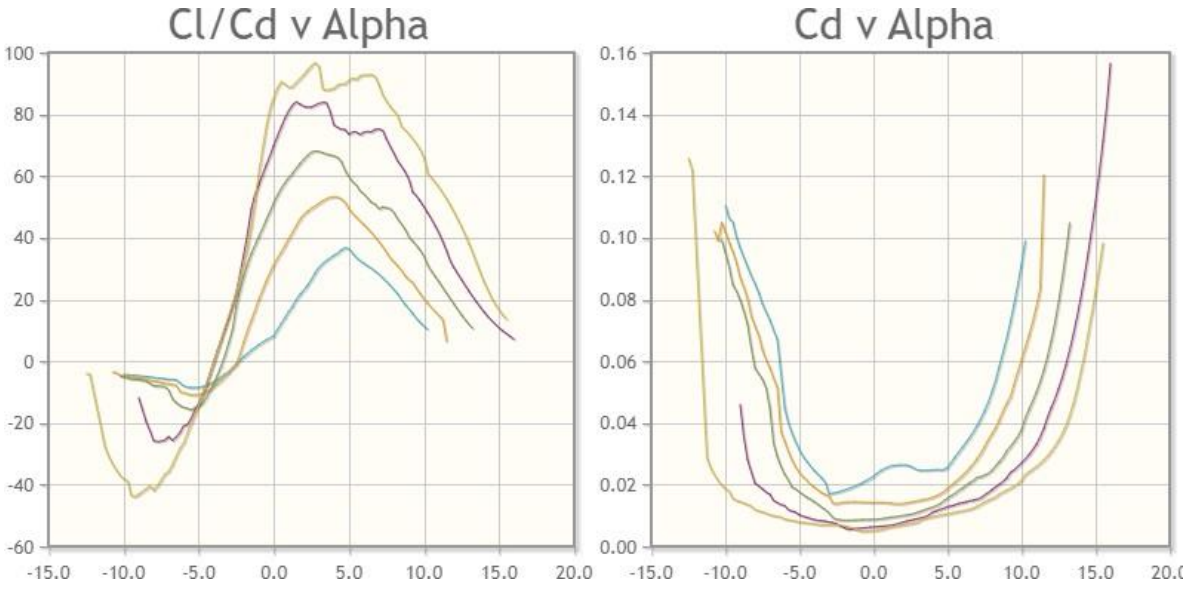

Fig.8) Graph

Sketch of mission profile

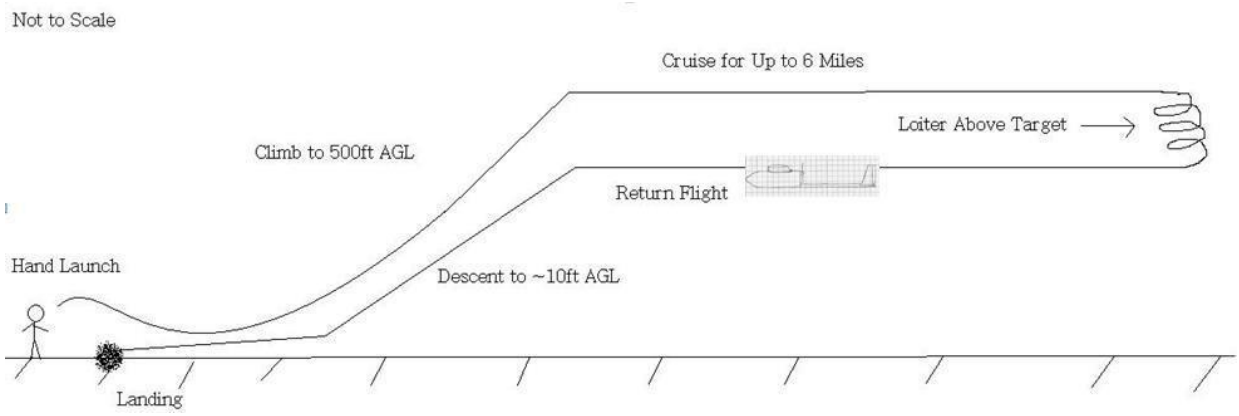

Fig.9) mission profile

Mission profile for surveillance

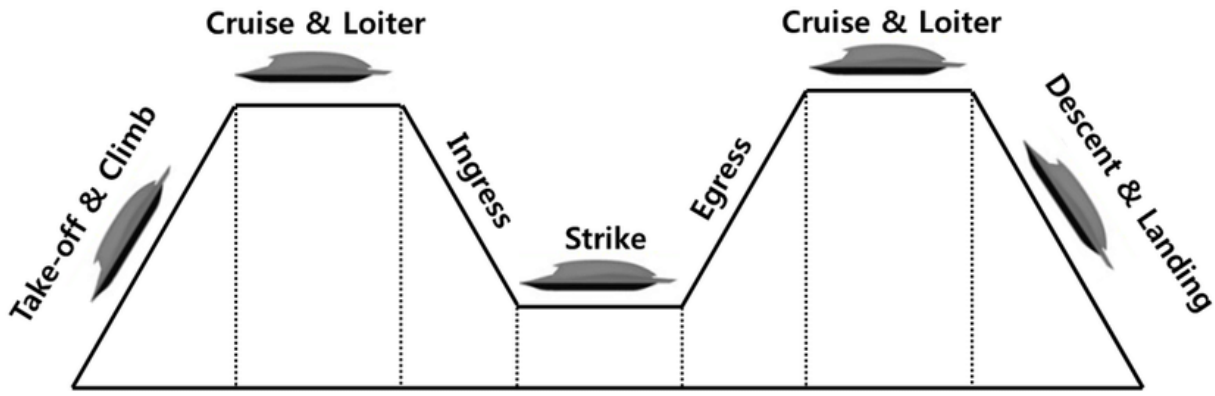

Fig.10) Mission profile for surveillance

Conclusion

The development of a hand launch stealth UAV for military purpose has been a challenging and rewarding work. The output of the product is a highly advanced unmanned aerial vehicle and is capable to providing critical intelligence, surveillance, and reconnaissance (ISR) capabilities in challenging environments.

The hand launch stealth UAV is plan to designed to be quickly deployed and noiseless, providing real-time data to military commanders on the ground. It has designed with advance features like low-observable design, undetected in hostile environments, advanced sensors, clear and accurate data providing in low-light vision conditions.

Overall, the hand launch stealth UAV is a significant advancement in military technology, providing critical ISR capabilities to military forces around the world. Its innovative design and advanced capabilities make it a valuable asset for military operations, enabling better decision-making and improving the safety of military personnel.

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