Abstract - The idea of HALE (High Altitude Long Endurance) in Unmanned Aerial Vehicle (UAV) had been acknowledge for more than 30 years. The key focus for the development had been its energy sources, however, the new trend of HALE-UAV development had come to AI and automate technology for many purposes such as reducing error from human operator, handling both sudden and near future situations, and automatically and reduce energy consumption. Those previous two concepts were widely applicable idea for nowadays UAV developments. Nevertheless, there was a few UAV developments on the structure of them such as blade and body and those had been mostly developed for common use in any areas. This was the gap for this research to design a HALE UAV by using the three concepts of (1) energy source, (2) computing and IT systems, and (3) structural design to develop more efficiency HALE UAVs in the context of Thailand. This research would contribute to a better development of Thailand’s UAV which currently become the important roles in military and Farming.

Keywords — UAV, HALE, Design, Energy, AI, Automate Technology, Thailand

I. INTRODUCTION

A UAV or Unmanned aerial vehicle is a type of aircraft which has no onboard crew or passengers. In common name known as a drone, the flight may operate with various degrees of autonomy: either under remote control by a human operator or autonomously by onboard computers.

In the present day, UAV is important in business and Commercialization of the industry, has led to the development of downsizing and the development of affordable sales. As diversity and the nature of the work intensify, the development problem is aimed at software creation, automation, and increased air retention time, in response to most usage.

Energy is important for developing energy systems for UAV can stay in the air as much as possible. Development is based on several factors, including solar intensity, surface contact, and battery power conversion.

However, the design of the external structure reduces by the aerodynamics is an important designed to maximize the coverage of sun light as well. Study of Concept of Surface for energy-to-flight ratio and other factors such as weight, power consumption, motors and processors, etc. we will be discussed in further research.

II. UAV HISTORY

The UAV innovations started in the early 1900s and originally focused on providing practice targets for training military personnel, have come since the unmanned drones used by the US Air force in the 1940s. The Defense Advanced Research Project Agency (DARPA) is a federally funded program dedicated to sponsoring UAV development for military purposes. In the 1960s, the US started to develop ‘drones’, which were unmanned Arial vehicles developed for spying and reconnaissance.2,3

In the present day, America’s Federal Aviation Authority (FAA) estimated that there would, by 2020, be perhaps 15,000 such drones in the country. In this activity regulated and policed is The Federal Aviation Administration’s (FAA) new comprehensive regulations go into effect today for routine non-recreational use of small unmanned aircraft systems (UAS) – more popularly known as “drones”.6
III. Concept

These solar powered UAV’s have capabilities to fly from 50000 to 95000 feet. In 1995, NASA’s UAV-Pathfinder set an altitude record for solar aircraft by climbing to 50,500 ft. The latest of the larger NASA funded aeroVironment solar planes was Helios. Helios set an impressive altitude record of 96,480 ft in year of 2001.

In this concept Experiment, Power Energy of surface area in Solar cell generates as much energy as possible and designs to reduce wind resistance as well.

Fig. 2. Drone’s Aerodynamic\(^3\)

This study is designs for Solar Energy Generates with surface and aerodynamic design, and it is important to use computer simulations to test the most reception of Sun light.

IV. Setup Experiment

Step-up involves all process from that a solar UAV undergoes from drones testing to solar drone experiment.
1. Find information to collect important theories and designs, as well as find information on the product you are looking for.
2. Bring the prototype to use and build the selected solar cells.
3. Operating the horsepower using software for system testing.
4. Take the best form to calculate the surface capacity of solar cell using database Thailand.

The steps of 3 and 4 are saturation to fry can stay in Computer.

V. Conclusion

The development of more specific UAVs today has resulted in a different optimize design response. The Beauty in style is rather than quality. As a result, the actual quality is lower than real performance.

The development of the shape to expedite the potential as well as the flight time is an important. Design and simulation with three-dimensional software create the best before the actual build including, can be tested on a variety of factors.

In the next experiment, the best model will print with a three-dimensional printer, is actually tested.

REFERENCE