Skysong Innovations
Advancing the Arizona State University Knowledge Enterprise

1475 N. Scottsdale Road, Suite 200
Scottsdale, AZ 85287-3538
Phone: 480 884 1996 Fax: 480 884 1984

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Inventors

Wenlong Zhang
Dangli Yang
Daniel Aukes

Contact

Physical Sciences Team

Foldable Unmanned Aerial Vehicle Based on Laminate Structure

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Background

Unmanned Aerial Vehicles (UAVs) have shown to be in a continuous state of growth and have become an attractive solution across a wide range of field applications. UAVs have become popular for environmental monitoring, search and rescue, package delivery, and surveillance. Advancements in computer science, lightweight materials, and sophisticated sensors are pushing the limits of UAV technology. However, the relatively fixed structure of existing UAVs limits their maneuverability and also requires more energy to control flight behaviors. UAVs have the potential for being useful in new and complex situations, yet they are restrained by the conventional design making them useful in only in a handful of applications. Therefore, there is a need for a flexible UAV that may be adjusted to change configuration during flight or when landed.

Invention Description

Researchers at Arizona State University have developed a novel, foldable quadcopter design. Advancements in research have enabled a mechanism that allows the quadcopter's arm to be extended or retracted whether in flight or on the ground. The length of the arms influences the flight dynamics based on the task and environment of the UAV, allowing for superior control and flight stability. The structure can be manufactured from cardboard, acrylic or fiberglass, making the architecture design low cost, light and easy to produce. Furthermore, the foldable quadcopter design enables reduced energy consumption and fast prototyping, making it adaptable and efficient for new applications. This novel UAV is portable, flexible, and allows one to select between maneuverability and stability during flight which enables a wider range of dynamic control.

Potential Applications

- Surveillance
- Search & Rescue
- Military
- Surveying & Mapping
- Agriculture

Benefits and Advantages

- Dynamic – Selectable maneuverability facilitates control and stability for tactical or casual flight situations
- Efficient – This novel mechanism design enables significant reduction in energy consumption for longer use
- Innovative – A lightweight and portable structure allows for fast prototyping and low-cost production
- Powerful – Novel architecture make this design capable of functioning in new applications

Original Document

Dr. Auke's Website

Dr. Zhang's Website