Available at www.ijsred.com

RESEARCH ARTICLE OPEN ACCESS

# DRONE ASSISTED MECHANICAL ACTUATED HIGH -RISE METAL SHEET ROOF CLEANER

**VINOTH RAJA S[1], SIDDTHIK KUMARAN SP 2, VIJAYAKUMAR S 3 , SATHYAMOORTHY S4, SANTHOSH S 5, SARAN RAJ B6, VIKNESH A [7]**

Mecanical Engineering, Murugappa Polytechnic College, ChennaiEmail: vinothsvr81@@gmail.com [2]
Mecanical Engineering, Murugappa Polytechnic College, Chennai Email:siddthiksiddthik3@gmail.com
Mecanical Engineering, Murugappa Polytechnic College, Chennai Email: vijays2mpc@gmail.com
Mecanical Engineering, Murugappa Polytechnic College, Chennai Email: jilcoolproduct@gmail.com
Mecanical Engineering, Murugappa Polytechnic College, Chennai Email: bradha1518@gmail.com
Mecanical Engineering, Murugappa Polytechnic College, ChennaiEmail: candyboy483@gmail.com

----------**********----------

## Abstract:

Many companies around global, go up with the technology and reduce man power, as of in the production it is already widely developed now cleaning drones have set their foot in the maintenance of the company sector. In order to reduce the manpower and money spent over this cleaning we have come with the cleaning drone which is highly helpful in maintaining. This specially designed drone has the capability of sticking to the surface and cleans out the entire area that has to be maintained. The drone camera in our drone helps in monitoring the operation and brushes are used for cleaning and the tether is used for the supply of clean water. this technology saves time and human energy and eliminates the work errors and monitoring makes the work perfect.

Keywords: **DRONE ASSISTED MECHANICAL ACTUATED, HIGH -RISE METAL SHEET ROOF CLEANER**

.

----------**********----------

## I. INTRODUCTION

A roof-cleaning drone is an innovative device designed to clean roofs safely and efficiently without requiring manual intervention. Equipped with advanced features such as water jets, brushes, sensors, and AI navigation, it can remove dirt, moss, algae, and debris from various roof surfaces. The drone enhances safety by eliminating the need for workers to climb dangerous heights, reducing the risk of accidents. It offers a cost- effective and time-saving solution for residential, commercial, and industrial applications. Designed to be environmentally friendly, it minimizes water and chemical usage while ensuring effective cleaning. This technology is particularly useful for hard-to-reach or hazardous areas. Roof-cleaning drones represent a modern approach to maintaining building hygiene and longevity. Drones can clean any kind of structure imaginable that would be difficult or dangerous for a person to clean. For example, the steeple of a church, a dome, the sides of tall towers, the sides of bridges, or any place. Where it would take some logistics to get someone close enough to clean Cleaning drones are outfitted with a low or high pressure nozzle that is tethered to a water source on the ground.

Drones can clean any type of building material such as brick, steel, wood, or glass. Drones can clean windows, roofs, and difficult to reach gutters. Drones can also clean solar panels, wind turbines, and solar farm mirrors. Any surface that a human can clean, a drone can done

## OBJECTIVE

Drones have long since ceased to be toys, but very serious devices that carry out inspections, can save human lives or perform cleaning in dangerous places. The drone makes the inspection faster and cheaper than people and with the software defects can be recognized immediately. There is a large circuit of people who fly drones for hobby or work. Think, for example, of photographers. All these drones have an important similarity. They are small, fly on a battery and can carry a limited load. Cleaning drones have a completely different concept. They are quite large, only fly for fifteen minutes on a battery and are therefore usually connected to the ground for the power supply, and most importantly: they can carry a load of 145 kg.

**COMPONENTS**

- Frame
- Motor
- Electronic Speed Controller
- Propeller
- Battery
- Remote Controller
- Spraying System
- Sensor
- Miscellaneous Components

IOT REQUIREMENTS

The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber physical system, which also encompasses technologies such as smart grids, virtual power plants, smart homes and smart cities. Each thing is uniquely identified through its embedded computing system but is able to interoperate within the existing internet infrastructure

Allot of technologies to interact with living things but IoT enables to communicate with non-living things with comfort manner. IoT is a convergence of several technologies

Hexa-copter has six motors attached to the frame with arms, these motors rotate the propeller at very high speeds to generate thrust. To achieve stability, three motors are made to rotate in clockwise (CW) and counter clockwise (CCW) directions. With this setup, it is able to cancel the net moment about the drone's yaw axis heating system. The paraffin wax is incorporated in the heat exchanger, which acts as thermal energy storage device. like ubiquitous, pervasive computing, Ambient Intelligence, Sensors, Actuators, Communications technologies, Internet Technologies, Embedded systems etc.

- **Comparing ARDUINO board with other controller**
- Well known, controllers to us are 8051, pic 16f/18f, ARM7, msp430, other latest boards like Intel Galileo Gen 2 etc. Out of all these ARDUINO is the best.
- We require two UARTS, but pic 16f/18f and 8051 has only one UART.
- Whereas ARDUINO has two UARTS as

Motors for drones and UAV applications, ranging from miniature class multi-rotors, to heavy-lift systems used in industrial and military flight operations. Our motors for drones lead the market in performance and vibration-less flight operation. From commercial and industrial heavy lift operations to personal and hobby motor upgrades. This type of motor is used in drones due to their high-speed rotation.

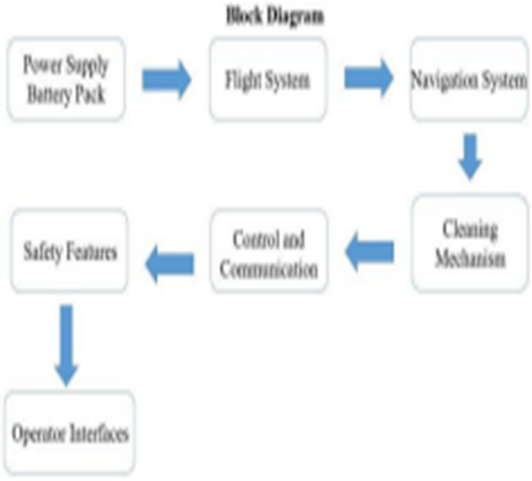
After the segmentation, the expected display of the hand prints is involved in Pre-processing. Operations like noise removal, resizing, normalization and enhancement fall under this phase to provide better image quality and consistency and make it robust. The system proceeds to Feature Extraction after pre-processing.

Here are some keywords that are used in the API. Understanding of these terms will make the API documentation easier to understand.

Propellers are devices that transform rotary motion into linear thrust. Propellers are arranged in pairs either in clockwise direction or in the anti

clockwise direction. As in the case of hexa-copter three are for clockwise direction and the other three for anticlockwise direction which are placed diagonally. As suggested from the motor selection, between the propeller sizes 14-16 inch to have the maximum thrust the suitable propeller is considered to be 15-inch propeller

**PROCESS FLOW - METHODOLOGY**




product or embedded software generation.

CATIA provides a suite of surfacing, reverse engineering, and visualization solutions to create, modify, and validate complex innovative shapes. From subdivision, styling, and Class A surfaces to mechanical functional surfaces. Mechanical Engineering: CATIA enables the creation of 3D parts, from 3D sketches, sheet metal, composites, and melded, forged or tooling parts up to the definition of mechanical assemblies. It provides tools to complete product definition, including functional tolerances, as well as kinematics definition. Equipment Design: CATIA facilitates the design of electronic, electrical as well as distributed systems such as fluid and HVAC systems,

CATIA can be customized via application programming interfaces all the way to the production of documentation for manufacturing. Systems Engineering: (API). CATIA V5 & V6 can be adapted using CATIA offers a solution to model complex and Visual Basic and C++ programming languages via intelligent products through the systems engineering CAA (Component Application Architecture); a component object model (COM)-like interface. approach. It covers the requirements .

## CONCLUSION

With help of modern technology, we can maintain our area neat and clean without investing more manpower. By this cleaning drone we could possibly eliminate the wastage of time and money. The drone makes the inspection faster and cheaper than people and with the software defects can be recognized immediately, in case of an unavoidable situations, the drone technology comes handy and help in scheduled date cleaning. This technology can be improvised by automating the flight path and this could neglect completely the usage of human resources for piloting. Further this drone can be made removable and add other application and make them entirely handy with other operations.

## ACKNOWLEDGMENT

We express our gratitude to Murugappa Polytechnic College for providing resources and support for this study. Special thanks to our project guide, Vinoth raja S, for her guidance throughout the research. Additional appreciation is extended to healthcare professionals and medical imaging specialists who provided

## REFERENCES

- Par dell, Ricard. “AGCFDS: Automated Glass Cleaning flying drone system”. EP 3 126 067 B1. (2015)
- WO-A2-2013/076711
- KR-A-20030 025 662
- US-A1-2012 083 945
- JP-A-2003 026 097
- US-A1-2009-120 653
- 7MMuhammad, teal. “Autonomous Quadcopter for Product Home Delivery”. 10.1109/ICEEICT.2014.6919154
- Thaub, Lance w. “Range and Endurance Estimates for Battery-Powered
- Aircraft”. Vol. 48, No2011. 9.https://www.embention.com/news/catapults -for-uavs-are-specific equipment-to-put drones-into-flight/ - take-off and landing