UNMANNED AERIAL VEHICLE TO REMOVE URANIUM PARTICLES IN COOLING TOWER

[1]B.A. Abesha Benze, [1]E. Esakkiya, [1]V. Niyandha Jyothi, [1]CH. Vijayalakshmi, [2]K.Nandha Kumar

[1]UG Scholar, Department of ECE, Gojan School of Business and Technology, Tamil Nadu, India.
[2]Asssitant Professor, Department of ECE, Gojan School of Business and Technology, Tamil Nadu, India.
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Abstract - *The nuclear power plant radiation waste is more hazard to human beings .The radiation wastage is produced inside nuclear reactor by uranium particles. Uranium is Split into harmful particles like krypton, barium, chromium and these are also most tiny The removed wastes are been stored in spent fuel cooling pool, after 100 years these wastes are mixed with sea without separation of uranium particles.*

Needs: In order to remove deposited uranium particles in nuclear power plant.

Objectives: To produce enormous numbers of electricity by reuse of contaminated uranium particles and remove the deposited particles.

Key Words: Drone, Actuator, FPV Camera, Sucker.

1. INTRODUCTION

In nuclear power plant, the cleaning of splitted (barium and chromium) and deposited uranium particles which is on the cooling tower wall during releasing of steam. In which the deposited particles is difficult to remove fully. The partial amount of particles on the cooling tower wall leads to some diseases to human beings due to nuclear radiations. In order to remove that partial amount of uranium particles on the cooling tower wall, the AERIAL VEHICLE is used. Which is also used to remove the deposited particles. The uranium particles are poured into the numbers of Krypton alloy, so that the electricity is produced and radioactive nuclear waste are also contaminated over 100 years and released into sea. The contaminated waste contains uranium which is hazards to sea animals. So by the use of AERIAL VEHICLE uranium is separated from deposited particles. Particles which is deposited on the cooling tower wall. So this project is to remove the deposited uranium particles in nuclear power plant by using Drone and Actuator. By arising sucker which is fixed on the actuator the deposited particles can be sucked with the help of drone, by introducing this method maximum number of diseases

Can be reduced which is cause by radiation. Here the drone is used mainly for removing the unwanted particles which is sucked at the top of the cooling tower wall.

2. EXISTING SYSTEM

Spray nozzles have been used to remove the deposited uranium particles on the walls of cooling tower. The removed wastes are been stored in spent fuel cooling pool, after 100 years these wastes are mixed with sea without separation of uranium particles.
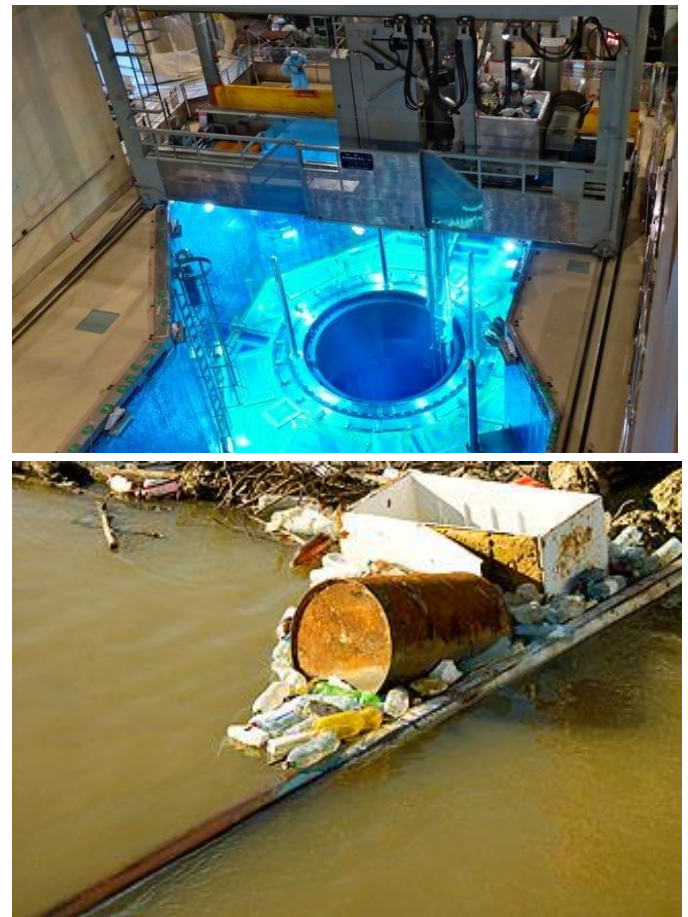

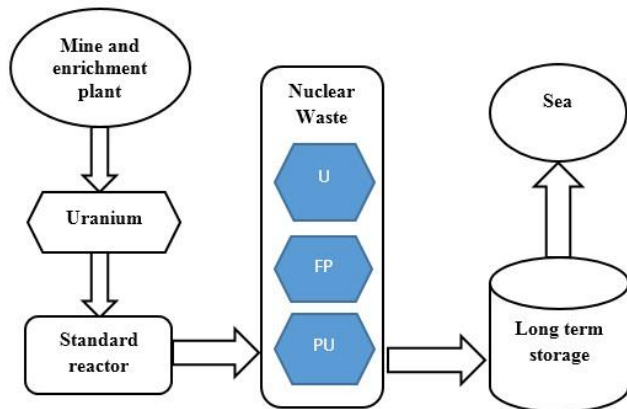**Fig-1:** Uranium particles on the walls of cooling tower

Fig-2: Block diagram for existing system

3. PROPOSED SYSTEM

In existing method, the release of uranium particles are removed by Spray nozzle this method is not effective for removing uranium particles.

In this paper we have highlighted by using Unmanned AERIAL VEHICLE to remove the deposited uranium particles in cooling tower and also it can remove various deposition in contaminated structure.

This PI Camera Module can attach to the raspberry pi CSI port using 15 pin ribbon cable by using this PI camera which can be used to take pictures and high definition video.
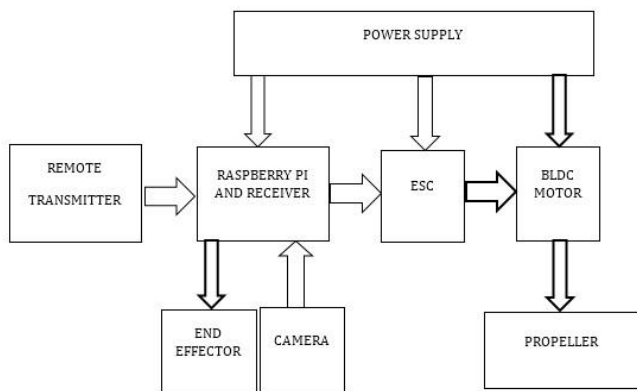

Fig-3: Block diagram for Proposed System

4. WORKING

In quad copter, the BLDC motor is used to rotate the propeller in both clockwise and anticlockwise direction. Since the BLDC motor gets damaged in maximum speed in order to avoid this the ESC (Electronics Speed Control) controller is used. In the quad copter the four ESC drive are connected together, from that the input is given to flight control board. The flight control board initially connected to the lithium battery (11.1V). Finally

the receiver is connected near to the flight control board and its frequency is about 2.4GHz.

The raspberry pi, which is used to interface camera and actuator. The FPV camera is used to view the respective path and by using Wi-Fi it can be viewed by ANDROID. The main aim of camera is to view a uranium particles. The uranium particles is shapeless and particular color (green, black, brown and grey). So for that, these five samples are given to FPV camera. Then the camera is activated when the drone is ON, power supply is taken from Li-Po battery through raspberry pi. The role of actuator is to detect a uranium particles and automatically removed. The three servo motor is used for the movement of arm, the power supply for actuator is taken from raspberry pi. The automatic movement is programmed in python software so that the arm detect the uranium particles automatically. For sampling these five image an image processing technique is used.

5. HARDWARE REQUIREMENTS

- ✓ BLDC motor.
- ✓ ESC (Electronic Speed Control).
- ✓ Battery (lithium polymer).
- ✓ Flight control board.
     Balena Etcher.
- ✓ Raspberry pi-3.
- ✓ FPV camera.
- ✓ Servo motor.

6. SOFTWARE REQUIREMENTS

- ✓ Advanced IP scanner.
- ✓ SD card formatter.
- ✓ Python 3.8(32 bit).
- ✓ Win 32 disc imager.
- ✓ Moba Xterm.

7. ACTUATOR

The actuator is an intrinsic of machine that is responsible for moving and controlling an instrumentation or system.

Fig-4: Diagram of Actuator

The End Effector are designed to perform removal of deposited uranium particles. The terminus of kinematic chain of the manipulator is called end effector. The deposited uranium particles are automatically detected or sensed by an automatically programmed actuator and also removed automatically.

8. INTERFACING CAMERA

FPV Camera is fix to drone to send real time video down to the ground using video transmitter. The FPV Camera allow you to see where the drone is flying as well as the deposited uranium particles in the cooling tower.

Depending upon the drone and actuator the FPV transmitter will send the live video signal to the remote control screen in the smart phone device. FPV camera use either CMOS or CCD sensor.
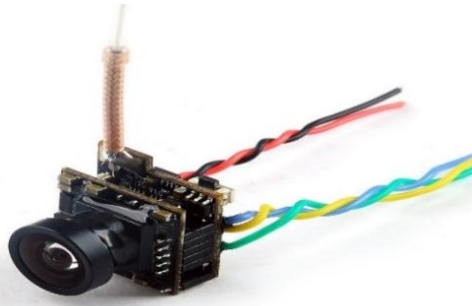

Fig-5: Diagram of Actuator

9. CONCLUSION

In this project "the unmanned aerial vehicle for removal of uranium particles", the deposited uranium particles can be removed in short period of time and also reduces radiation hazard for human being. The main of this project is to reuse, a removed uranium particle to produce electricity as well as for respective needs.

Table-1: Output comparison

Throttle (%)	Current (A)	Voltage (V)	Power (W)	Thrust (g)
0	0.1	12.37	1.2	0
25	1.6	12.3	19.2	143.8
50	4.1	12.24	50.1	317.5
60	5.8	12.1	70.2	413.6
70	7.5	11.98	92.2	448.8
80	10.1	11.86	119.6	689.6
90	12.9	11.72	150	702
100	14	11.59	159.9	777.5

10. FUTURE ENHANCEMENT

In future enhancement, the actuator can be programmed in such a way that, the actuator can able to automatically detect the uranium particles inside cooling tower and also automatically remove those deposited uranium particles.

The camera can also be fixed in the drone so that we can able to view the deposited uranium particles lively.

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BIOGRAPHIES

B.A. Abesha Benze pursuing her Bachelor Degree in Electronics and Communication Engineering from Gojan School of Business and Technology, Tamil Nadu, India. She awarded as TISLA Ambition and Achievement Student Academic Award conducted by IEI, Tamil Nadu in 2019. She has secured 1st position in Trouble Shooting in Household Appliance Organized by IEI Gojan Student Chapter in 2019. She has secured 10th place in State Level Chess Tournament conducted by Saveetha University, in 2019 and also secured 15nth State Level Chess Tournament conducted by Saveetha University in 2020. During the school day she has secured 12th place in State Level Children's chess Tournament in 2011. . She participated in "National Level Conference on Recent Trends in Engineering and Technology" and presented a paper in the title of "Unmanned Aerial Vehicle for Removal of Uranium Particles in Cooling Tower". She has received many certificates from Various Events, Presentation and Participation and attended many webinars.

E. **Esakkiya** pursuing her Bachelor Degree in Electronics and communication engineering from Gojan School of Business and Technology, Tamil Nadu, India. She awarded as TISLA Ambition and Achievement Student Academic Award conducted by IEI, Tamil Nadu in 2019. She has secured 1st place in "State Level Essay and Poem Competition" Conducted by Nadar Saraswathi College of Engineering and Technology on 2015. She was participated and won more prizes in "Zonal Level Athletic" and "State Level Chess Tournament". . She participated in "National Level Conference on Recent Trends in Engineering and Technology" and presented a paper in the title of "Unmanned Aerial Vehicle for Removal of Uranium Particles in Cooling Tower". She has received many certificates from Various Events, Presentation and Participation and attended many webinars.

V. **Niyandha Jyothi** pursuing her Bachelor Degree in Electronics and Communication Engineering from Gojan School of Business and Technology, Tamil Nadu, India. She was secured 1st position in Trouble Shooting in Household Appliance Organized by IEI Gojan Student Chapter in 2019. She participated in "National Level Conference on Recent Trends in Engineering and Technology" and presented a paper in the title of "Unmanned Aerial Vehicle for Removal of Uranium Particles in Cooling Tower". She has received many certificates from Various Events, Presentation and Participation and attended many webinars.

CH. **Vijaya Lakshmi** pursuing her Bachelor Degree in Electronics and Communication Engineering from Gojan School of Business and Technology, Tamil Nadu, India. She awarded as TISLA Ambition and Achievement Student Academic Award conducted by IEI, Tamil Nadu in 2019. She secured 2nd position in 800m Anna University Zone match in 2019. She secured 3rd place in 4*400 Relay in Anna University Zone match in 2018. She participated in "National Level Conference on Recent Trends in Engineering and Technology" and presented a paper in the title of "Unmanned Aerial Vehicle for Removal of Uranium Particles in Cooling Tower". She has received many certificates from Various Events, Presentation and Participation and attended many webinars.

Nandha Kumar K received his Master's degree in Applied Electronics from Gojan School of Business and Technology, Chennai, and is a Bachelor degree holder from Syed Ammal Engineering College, Tamil Nadu, India. He is working as Assistant Professor in Gojan School of Business and Technology and has close to 2 years of teaching experience in the Department of Electronics and Communication Engineering. He has published two research paper in International Journal and Attended a National Level Conference and He has attended a many Workshop, Seminar, many online Certification Courses and Faculty Development Programs. His research interests include Communication, Embedded, Networking, Robotics and IoT.