

# Balloon Transport of Domestic Water

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## Abstract

Water is one of the most important part of life on Earth. It comes under basic need of every individual. If there was no water, there would be no Life. There are many ways in which we can collect water: Surface water, rivers, lakes, springs, rock catchment areas, excavated dams, bores, wells, artesian bores. But sometimes, lack of water isn't the problem but the major difficulty is in reaching the nearest source of water, which the societies hunt for. Water is not always an easy thing to move because it is heavy and it can become unsanitary for use. 71% of Earth is covered with water; from which 97.5% is saline water and remaining 2.5% is fresh water. Only 0.03% water is available for human use. Traditionally, water is transported over long distances through tanker trucks, pipelines, aqueducts. In this project, saline or freshwater from storage places will be placed in vacuum chambers to perform evaporation over it. In chambers the saline water will be converted into fresh cold water vapors and then that vapors will be stored in the smart balloons and attached to automated drones. Automated drones will be used to transport the smart balloons from source location to destination, where the vapors will be converted into fresh water in vacuum chambers and will be then used for human use. This project is Conversion and Transportation of Saline water to Fresh water over long distances.

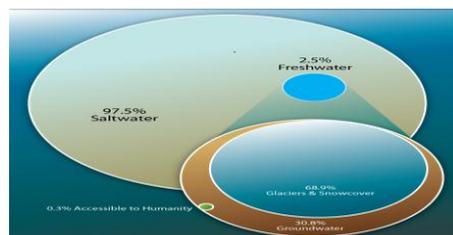
**Keywords:** *Arduino, Ultrasonic Sensors, Camera, Drone, Artificial Intelligence, Insulator, GPS, Robotics*

## Introduction

Generally, the water is considered as life on earth. There are various places at we need to use the water but the availability of water is very less. It is easy task to transport water in the nearby areas but it is really a hectic task to transport the water for long distance. To ease the transportation, we are designing a system to transport the water over long distances.

## Need of The System:

As we know it takes a lot of time and effort to transport water over long distances efficiently. You don't want to spend hours spending the suppliers and trying to figure out who is trusty. We pay approximately 600rs for 10000 liters in local areas. It should be cost efficient and quality of water should be maintained. You don't need to worry about the cost and quality of water.



**Fig: Water Availability**

## LITERATURE SURVEY

### HISTORY:

Moving water over long distances is costly, energy intensive, and can have significant environmental, social and cultural impacts. In particular situations and areas, pipelines, canals, trucking etc. can be useful way to improve the availability and reliability of our water supply. Significant infrastructure projects that transport water have previously been undertaken. However, none have been on a scale that would move large volumes of water for such a long distance effectively and efficiently.

### TRADITIONAL METHODS

#### 1 Pipelines:

Pipes is the most commonly used method for transportation of water, constructed either above or below ground. To maintain the flow of water in pipelines over a long distance regular pumping stations are required. Pipelines minimize the amount of water loss because the water is not exposed to sun light. However, the water may still need to be treated at both the source and at the end point, with any treatment processes adding to the significant energy and greenhouse costs of piping water.

#### 2 Trucking and Shipping Water:

Trucks or tankers are used to transport water from one place to other. It is very costly even generate various greenhouse gases. Trucks are often used to transport water to towns in times of drought. It is used to transport water over short distances.

#### 3 Canals:

Canals are open channels cut through the land. Pumping is required to move water through canals over longer distances. A canal has to follow the ups and downs of the land. Canals lose water through leakage and evaporation. To overcome this, a canal has to transport at least twice as much water as is needed for consumption. All these increases the expenditure required for constructing canals.

#### 4. Water Skin Bag:

People used water skin bags to transport water. It's one of the oldest methods, but it's still used across developing countries

#### 5. Water Bomber:

The most common types of aircraft used are helicopters and fixed-wing aircraft. Helicopters may have fitted with tanks (Helitankers) or carry buckets beneath them. Air Tankers or Water Bombers are fitted with tanks that can be filled either at ground level, or by skimming water from lakes, reservoirs, or large rivers.

#### 6. Water Wheel:

An American company, developed a revolutionary water transportation device to make the water collecting process more efficient, named as Water Wheel. It is a round 50-liter container that allows people to roll and transport water from one point to another.

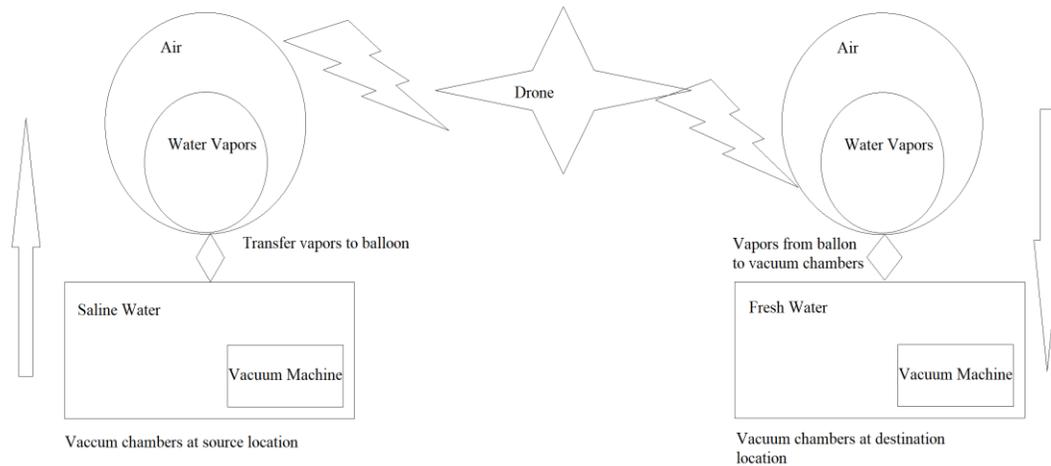
#### 7. Water Balloons:

Water balloons are ubiquitous summer water transporter. They're light in weight and come in different colors. They're also small enough to t anywhere. But the moment it gets thrown mid-air and lands, it bursts.

### WORKING

- A. Arddrone: Arddrone is a robotic device, working on both remote controlled and autonomous. The arddrone is to be designed to lift the balloon up and carry the balloon from the source location to destination location.
- B. Vacuum: Vacuum is the gaseous pressure less than the atmospheric pressure. The vacuum will be used in the container to convert the water into gaseous state at source and to convert the vapor in water at destination.

- C. Insulating Coating: Insulator i.e. thermal material which prevents the change of state. The balloon will be having insulating coating that will prevent the balloon to maintain the gaseous state and will not affect the external pressure on the balloon.
- D. GPS: Global Positioning System is a space based radio navigation system owned by United States of America. The GPS will be applied on the balloon and drone, so we can set the source location and destination location.



**Fig:1 System Architecture**

In this proposed system, we will collect the water from the areas where water is in abundance. The collected water will be inputted to the vacuum chambers. The pressure will be maintained at the level where the saline water will stay below and the fresh water will be converted in the vapor form. Then the vapors will be transferred to the balloons. The balloon will have air at the pressure of -5 deg. cel. And the interior balloon will have the vapors. The balloon will be attached to the drone. Using drone, the balloon will be dispatched to the destination location. At destination the vapor will be transferred to the vacuum chambers and the water will be generated from the vapors.

**MATHEMATICAL MODEL:**

$$S = \{I, P, O, C\}$$

Where,

S=System

I= Input

P= Process

O= Output

C= Constraint

P = {

$$P1 \{I, P, O\}$$

$$I = \{Water$$

$$Vacuum\}$$

$$P = \{Vaporization,$$

$$Hv=q/m g$$

where,

Hv=Heat of vaporization

h=heat

m=mass

O= {gas | vapor created}

O= {true | false}

P2{I, P, O}

I= {Rubber

Insulating Material

P={Creation}

O= {Balloon created}

P3{I, P, O}

I= {Frame

Sensors-GPS

Electric Speed Controller

Battery

Mechanics

Landing Gear

LED

Shell

Frame Type

Motor

Propellers

Prop Saver

Power Distribution

Firmware

Battery Elimination Circuit}

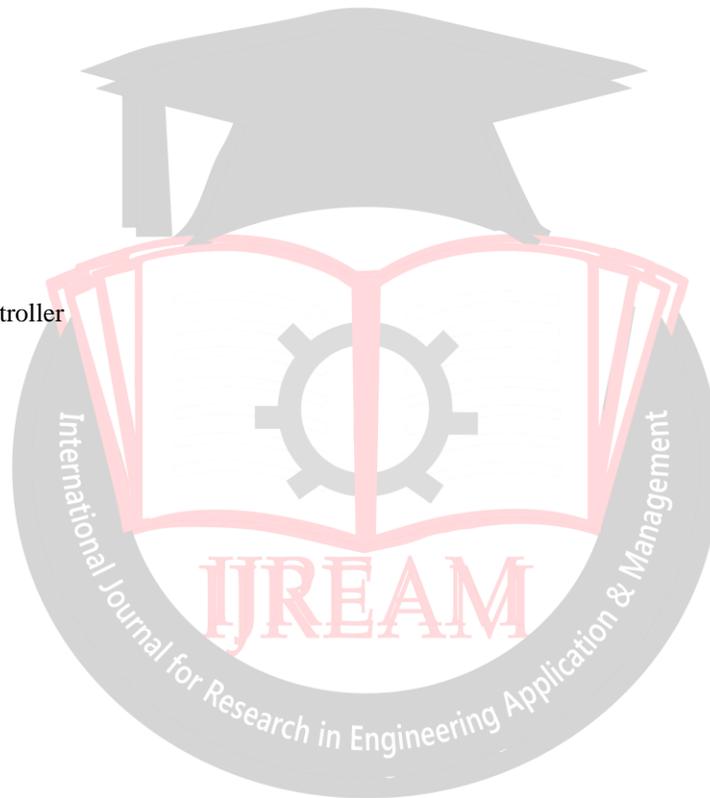
P= {Creation of drone}

O= {Drone created}

P4{I, P, O}

I= {Pipe}

P= {Transferring vapor through pipe into balloon}



O= {balloon contains vapor}

P5{I, P, O}

I= {balloon}

P= {Attachment}

O= {balloon attached with drone}

P6{I, P, O}

I= {drone

Source location

Destination location

GPS Sensor

Actuator

AI

Tracking}

P= {Transfer drone to destination

Tracking

Landing}

O={Land}

P7{P}

P={Condensation}

}

O = Water is container at destination

C = {C1. Vapor State should be maintained in the balloon

C2. Obstacles should be avoided while transporting balloon}

I = Water in the container at source

## Conclusion

Water plays very important role in our life. Every living thing present on Earth requires water. But it is inconvenient to carry large amount of water in distance-wide locations. We usually face difficulties in transportation of water over long distances. Therefore, we introduce a system which helps to transfer water from one location to other. We used the vacuum to generate vapors and insulating balloons to transfer the vapors from one location to another location. The GPS is used to set the destination and tracking of balloon. Then at destination the water is condensed and used for various purposes.

We successfully completed the documentation required to develop our proposed system and have also learned various aspect of systems including existing system through preliminary review.

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