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# U-CRAFT (UNIVERSAL CRAFT)

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***Abstract*— This object Ucraft is very useful for Transportation of goods as well as passengers Which doesn't need any terrain path, which means ultimate off road transportation made feasible. In modern times, due to heavy traffic leads to undue congestion and delay in reaching destinations, Due to vast potential available in the upper space, which can be made use by this method Of transportation. This new method relates to flying using called centrifugal force made to or constrained to linear force.**

***Index Terms*— Flying object, centrifugal force, Off Road transportation**

## I. INTRODUCTION

**New Flying or lifting method**

**Existing Method of Flying objects:**

The All known flying object contains rotor blades, which create pressure difference P=⌠g h, that produces force or thrust and that helps objects to fly. It works on Bernoulli's principle.

**Draw Back of above method of flying objects**:

By adopting above principle for flying vehicles, we face following Drawbacks

1) It requires Atmosphere
2) It needs runway for take up and landing.
3) It cannot fly in low altitudes, even if it does, it requires huge space due to large
Rotors, such as helicopters, may also face failure of blades due to colliding with objects due to narrow space in the lower altitudes
4) It contains exposed rotor blades, which if it comes in contact with birds, will lead to its failure

## II. OBJECTS OF NEW INVENTION

To make flying safer, easier, affordable, avoid huge traffic congestion

## III. PROPOSED METHOD OF FLYING:

The above Drawback can be overcome by adopting the below mentioned principle. This new method relates to flying using called centrifugal force made to or constrained to linear force. This will be achieved by attaching fly balls of designed weight at the ends of levers as shown in the figure 1 and made to rotate, Due to centrifugal force($mw^2r$) the weight masses try to fly out, which if constrained will make The force in required direction. The magnitude of this centrifugal force can be kept constant or can be varied by changing any of its variables i.e., mass, angular velocity, radius of rotation. As we know the direction of this centrifugal force is ever changing, to make it unidirectional we will constraint all the degrees of freedom except in only one direction where we needed.

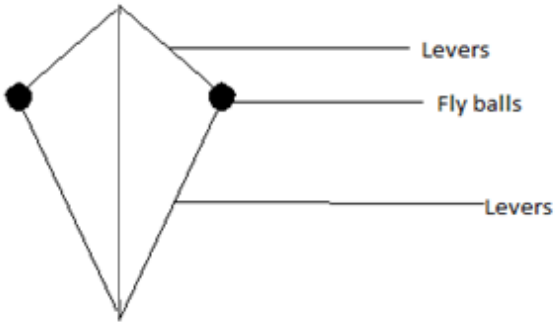


Figure 1

## IV. ADVANTAGES OF NEW METHOD OF FLYING

It doesn't need tyre, wheels, shock absorbing system, which simplifies construction and reduces weight.

Vehicle traffic can be made on different layers, one above the other in space, thereby reducing traffic.

It can take on anything land, water or sky. It can fly anywhere.

It will be highly useful for ghat sections and villages where road is not properly laid.

It doesn't depend upon the condition of the road.

Since force is directly proportional to the square of the angular velocity, small increase in speed may multiple the force developed and can travel at high velocities.

## V. POTENTIAL USE OF THE UCRAFT

1) Ucraft with fitting wheels or without wheels, it can be made to move on the road as any other vehicle, as and when Traffic congestion increases, it can be made to lift and fly in the air. since there is no gears and clutches to transfer power to the wheels, many losses avoided, it will be more efficient.
2) With suitable modifications, it can be made to steer inside the water like submarine.
3) With suitable fuel, it can be made to go even beyond our atmosphere and in to the space as a space shuttle and land on any other planet just like it got lifted from our planet.
4) It is both useful for both urban and rural areas for Transportation, as in urban areas due to Traffic congestion, vehicle can be made to fly one above the other at different layers, In rural areas where Road infrastructure is poor, it will be highly useful. It is also helpful to cross rivers and canals, no need of bridge required.
5) In Deserts, snow areas and marshy places, it is highly helpful, as it does not depend upon type of terrain path.

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**C. Prabhakar,** Helped in Design calculations in my Project work in Engineering Degree. Out standing performer for the Fourth Consecutive year in GIS function in Bharti Airtel Services and also in Alcatel-Lucent network management services Limited

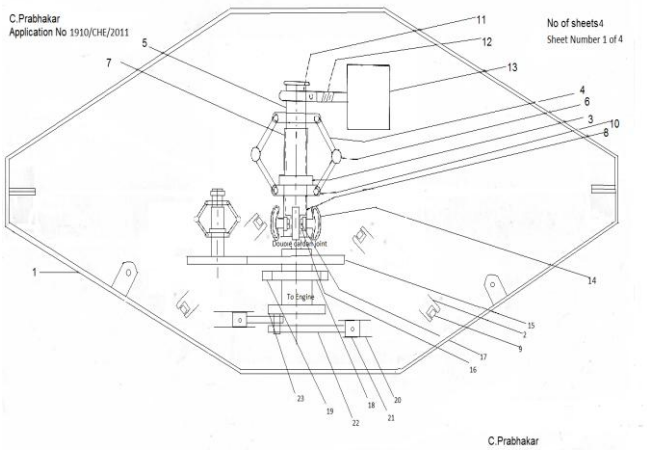
6) it will be useful to peer even through trees in jungles to explore it

7)It can land directly on any floor of the sky scraper buildings.

8)In tourism,aerial viewing of Parks and falls

9)It can be used in defence both for Transportation of troops, arms, ammunitions and saving lives at the time of natural disasters and also for RF controlled surveillance as in can take off and land vertically without any huge blades as Helicopter, opertable at any terrain including on the mountains without any huge air suction current and that too with small space(compact) and with less noise as that of IC Engine.

**Drawing Sheet No 1**

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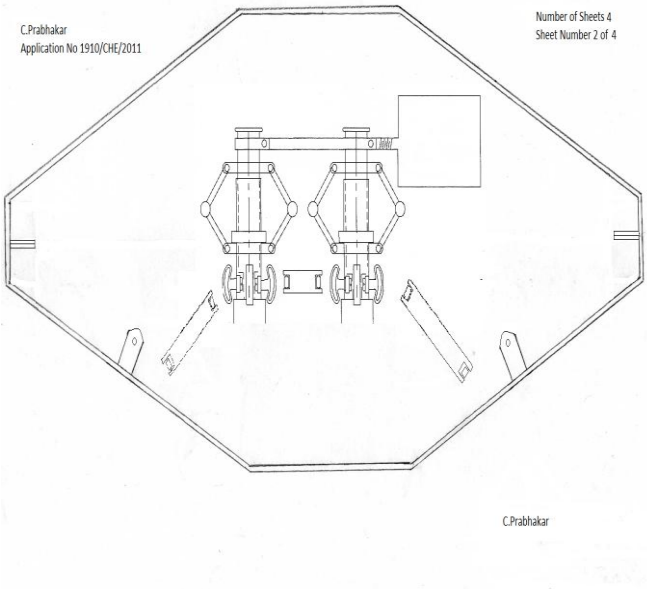
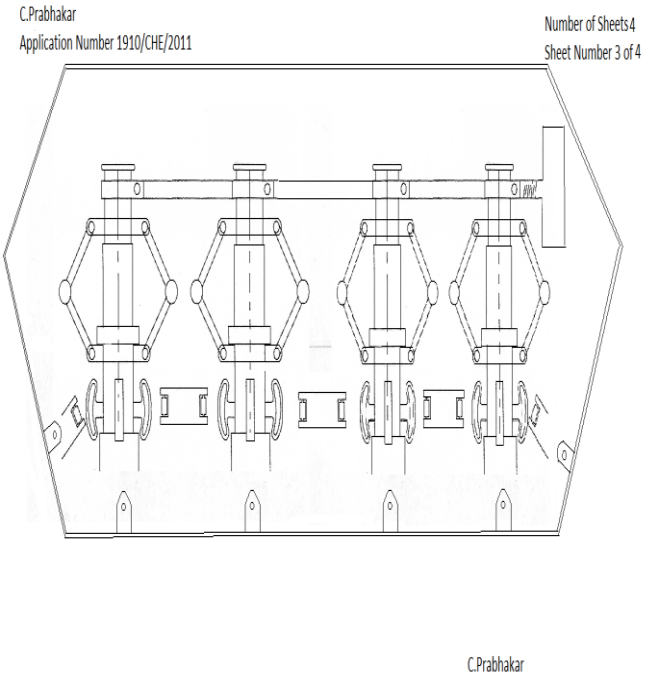



**Drawing Sheet No 3**

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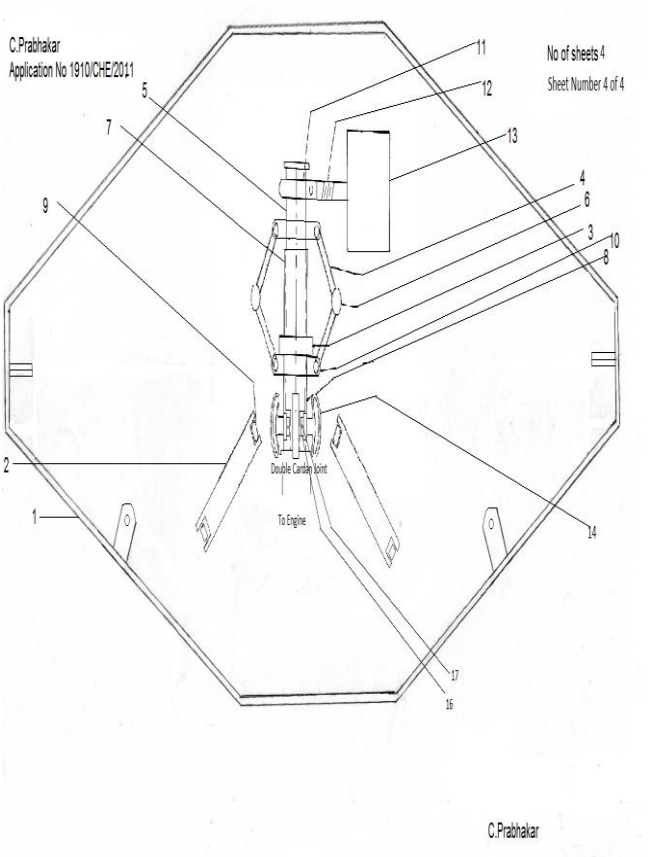
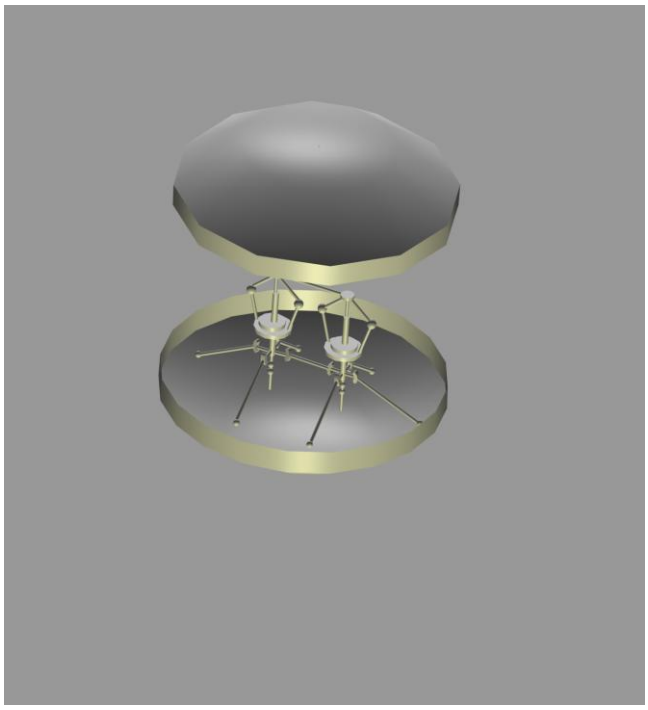


**UCRAFT 3D IMAGE 1**

**UCRAFT 3D IMAGE 2**



## VI. CONSTRUCTION OF UCRAFT

The below skeleton diagram shows sketch of proposed model.

1 represents the body frame of U-craft

2 represents levers attached from central shaft to the body, usually four in number at

Four sides of the body spaced at 90 deg apart to carry the whole vehicle.

3 represents stopper, which is usually adjustable to limit the angle of inclination of four levers attached also which Acts as pivot point where whole lifting force acts.

4 represents levers, which joins from central shaft to hinge point, where fly balls weight

attached and also from fly ball to hinge at stopper.

5 represents push rod, whose inclination decides the direction in which vehicle will move.

6 represents flyballs of calculated designed weight.

7.represents stationary hallow shaft ,through which central rotating shaft inserted.

8.represents rotating inner shaft, whose one side connected to Engines through double cardan

Joint which helps in inclination of rotating shaft in any direction, whose inclination is controlled by

Computer feedback servo controls.

9.represents roller which fits in to the flange of shape as shown in the fig, which avoids overplay

At any point of inclination of the central shaft.

10.represents special bearing, which allows rotation of outer mechanism, at the same time helping

the whole vehicle to lift at that pivot point.

11.represents bearing ,whose shaft connects through thread to the servo stepper motor or Hydraulic or

Pneumatic actuator, with swivel plate, whose function is to control the direction of inclination

of central shaft by using computer feed back control.

12.represents thread which helps central shaft to incline in steps using servo stepper motor or Hydraulic or Pneumatic actuators by using computer servo feedback control.

13.represents servo stepper motor or Hydraulic or Pneumatic actuator, whose overall function is to control the direction of inclination of central shaft, which decides the direction of motion of vehicle by using computer feed back control.

14.represents curved elongated cylindrical hole, which is four in number situated at 90 deg apart from each other, which fits into the roller of lever, which connects between central stationary shaft and to the body of U craft. This shape helps to avoid overplay and keeps roller always in contact at any point of inclination of central shaft.

15.represents gear and pinion connected from main mechanism to small similar mechanism as shown, which acts as antitorque mechanism placed at some calculated distance from main mechanism.

16.represents collar which helps curved cylindrical hole to rotate as well as gets fitted in the outer Stationary shaft.

17.represents cotter pin,which keeps collar in position.

18.represents break drum

19.represents break shoes to reduce the speed of the mechanism.

20.represents cylinder, where piston slides of IC Engine.

21.represents piston sliding in the cylinder of IC Engine.

22.represents connecting rod of IC engine.

23.represents crank of IC Engine.

## VII. WORKING OF UCRAFT

Ucraft consists of body frame(1) of shape like triangular, frustum of cone or any rectangular box shape ,so that the levers can be connected from body frame to central shaft to carry the whole vehicle. Any prime mover can be used as known in the field like petrol, diesel, gas or electric power to drive the Ucraft. The Central shaft(8) rotates, which in turn

drives the four levers(4) connected in the form of triangle, with calculated flyballs(6) attached, at the one corner of the Rhombus, as the speed increases, the balls fly apart with the force $mw^2r$,lower levers moves up along the central shaft,if it is free to move,it will move up along the central shaft. But, it is stopped by the stopper(3).lower levers are connected to special bearing(10), which allows rotation of outer mechanism, at the same time helping the whole vehicle to lift at that pivot point. The ratio of converting outward centrifugal force F to the upward force or downward force (R) is given by tan α=F/R or R=F/ tan α. To convert all the centrifugal force(F) into R,we need tan α=1,then α=45°.If we keep both upward and downward angle of inclination(α ) of the mechanism equal. Then, as mechanism is in the form of Rhombus, the upward(R) and downward forces(R) being equal cancel each resulting in only weight of the vehicle ,will not give motion to the Ucraft, So, by keeping the upward angle of inclination more than lower angle of inclination, we create forces of unequal magnitude, same can be done by keeping the downward angle of inclination more than upward angle of inclination. This unequal magnitude of force gives motion to the Ucraft in the direction depending upon the direction in which the resultant force acts.After starting the Ucraft, by keeping the central shaft vertically, the throttle increased, as the speed increases , Ucraft will get lifted up to the desired height. Then central shaft(Pushrod) inclined to the direction in the direction in which Ucraft has to move. As the accelerator increased, the speed of the Ucraft will increase and it will move in that direction. To stop or slow down the moving Ucraft, throttle controls are used to decrease engine speed or thrust for powered Ucraft. To completely stop the object in the horizontal direction , the central shaft is moved in the opposing direction against the direction of movement, which is done with help of computer servo controls. That is with the help of force sensors, which will measure magnitude of force acting in the direction of movement, which is fed to the computer controlled servo feed back control systems, which will control the direction of inclination of central shaft so that till the horizontal force becomes zero or neutralized. To bring down the Ucraft, By keeping the central shaft vertically, the speed of the central shaft is decreased gradually to land on the ground vertically. Along with that we can also place central brake disc, below the gears attached, coupled with break shoes to reduce the speed of the central rotating shaft.

Another important factor is Torque produced due to rotation of main mechanism, which may make the whole vehicle to rotate. In order to counteract that, anti torque has to be applied to neutralize that. **One of the method** is to find anti torque needed to avoid rotation of Ucraft place similar mechanism, smaller in size, side by the main mechanism, which is getting energy supply from main shaft through gear, which will rotate in opposite direction, which will act as anti torque agent .
**The sketch is shown in the Drawing Sheet No 1(UCRAFT 3D IMAGE 1)**

**One more method** to counter Torque is to place similar kind of mechanism placed side by side of same size. But, rotate in the opposite direction. So, that Torque produced by one mechanism will be neutralized by another mechanism.
**The sketch is shown in the Drawing Sheet No 2(UCRAFT 3D IMAGE 2)**

**Also, it can be extended** , mechanism after mechanism placed side by side, which will rotate in opposite direction with each other, which all controlled by centralized computer controls and in turn increase the capacity of the vehicle by large amount.**The sketch is shown in the Drawing Sheet No 3.**

## VIII. When vehicle has to move forward the forces acting are given below

The central shaft when it remains slightly inclined at θ, forces can be resolved in to Horizontal and vertical component. The vertical component balances the weight of the vehicle and Horizontal component makes the vehicle to move in that direction.

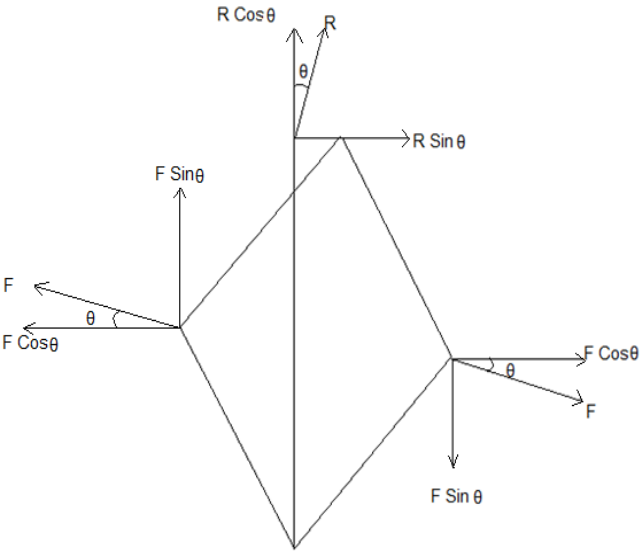



Figure 2

As you can see from the figure 2 that two F Cos θ acting in opposite direction cancel each other and Two F Sin θ acting in opposite direction also cancel each other. But, in top we can see that R Cos θ balances the whole weight of the Vehicle and R Sin θ makes the vehicle to move in the direction of Inclination.

## IX. Keeping angle of inclination different to give lift.(Mathematical Analysis)

If both upper and lower levers are inclined at the same angle, then both upper downward force and lower upward forces will be same, hence, due to compression the central shaft may fail. In order to avoid and give the lift, change the angle of inclination of the upper and lower levers. since both upper and lower hinges are floating not fixed to any ground. Let the upper and lower levers are inclined at angle α and ß respectively to the vertical as shown in the fig.R1 is the force acting upwards at outer stationary shaft and R2 is the force acting downwards vertically and F is the centrifugal force given by $m\omega^2r$.

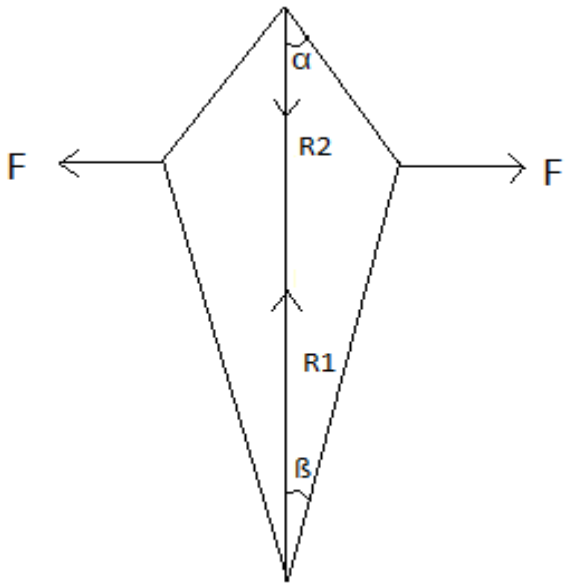



Figure 3

For simplicity from the figure 3. we can say that

tan α=F/R2 or R2= F/tan α

and

tan ß=F/R1 or R1=F/tan ß

From the above diagram and equation we can see that R1 should be more than R2, so that there is lift. This we can make by keeping upper inclined angle α more than lower inclined angle ß.

Let us calculate R1 and R2 by keeping arbitrary weight, radius and angular speed constant and varying α and ß and tabulate the table.

Let w=1kg, $l_1$=1m, g=9.8m/sec$^2$, r=$l_1$ sinα , ω=10rad/sec

| α | R2 | ß | R1 | r= $l_1$sinα | F | ω | R1-R2 |
|---|---|---|---|---|---|---|---|
| 10 | 10.09004 | 40 | 2.120731438 | 0.174444 | 1.7782263 | 10 | -7.9693116 |
| 20 | 9.776684 | 30 | 6.163752132 | 0.348889 | 3.556462793 | 10 | -3.6129318 |
| 30 | 9.245619 | 20 | 14.66501195 | 0.523333 | 5.334689093 | 10 | 5.41939259 |
| 40 | 8.48295 | 10 | 40.36028768 | 0.697778 | 7.112925586 | 10 | 31.8773376 |

Table 1

From the above Table 1 we can see that by keeping upper inclined angle α more than lower inclined angle ß, the difference R1-R2 is shown in the table, which is positive and large , it means lift of the ucraft once it exceeds more than self weight and downward force of the Ucraft.

## X. Free Body Diagram showing Main forces and Torques acting on Ucraft

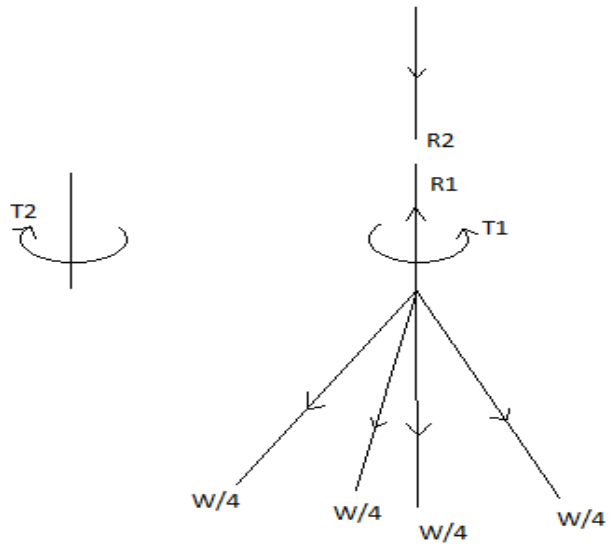



Figure 4

From the above figure 4, we can see that W is the weight of the vehicle,shared by four levers connecting from the body frame to central shaft,each carrying load of W/4. R2 and W is forces acting in the vertical downward direction and R1 in the upward direction and is given by

R2+W=R1

F/tan α + W = F/tan ß

Let us calculate R1 and R2 by keeping arbitrary weight, radius and angles constant ,varying ω and tabulate the table.

Let w=1kg, $l_1$=1m, g=9.8m/sec$^2$, r=$l_1$ sinα , α=40 and ß=10

| α | R2 | ß | R1 | r= $l_1$sinα | F | ω | R1-R2 |
|---|---|---|---|---|---|---|---|
| 40 | 8.48295 | 10 | 40.36029 | 0.697778 | 7.112926 | 10 | 31.87734 |
| 40 | 33.9318 | 10 | 161.4412 | 0.697778 | 28.4517 | 20 | 127.5094 |
| 40 | 76.34655 | 10 | 363.2426 | 0.697778 | 64.01633 | 30 | 286.896 |
| 40 | 135.7272 | 10 | 645.7646 | 0.697778 | 113.8068 | 40 | 510.0374 |
| 40 | 212.0738 | 10 | 1009.007 | 0.697778 | 177.8231 | 50 | 796.9334 |
| 40 | 305.3862 | 10 | 1452.97 | 0.697778 | 256.0653 | 60 | 1147.584 |

Table 2

From the above Table 2 we can infer that as the angular speed ω increases, R1-R2 also increases, which helps to propel the vehicle in that particular desired inclined direction.

T1 is the torque acting in the main central shaft and T2 counter torque should be so chosen to counter balance the Torque T1 and to be rotated in opposite direction with respect to main shaft, connected through gear. so that as a vehicle, it remains stable without rotating. That is $T1=F_1*r_1=T2=F_2*r_2$ Where $F_1$ and $F_2$ are centrifugal forces of main and side by small mechanisms and $r_1$ and $r_2$ are their corresponding radii **.**

## Authors Profile:

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**CAREER OBJECTIVE**:
To work in a position where I can apply my knowledge and skills for the growth of the organization.

**ACTIVITIES AND ACHEIVEMENTS**
Helped in Design calculations in my Project work in Engineering Degree.
Out standing performer for the Fourth Consecutive year in GIS function in Bharti Airtel Services and also in Alcatel-Lucent network management services Limited.

**Applied for Patent** for the design of a **New kind of Flying object (Ucraft)** , unlike conventional Flying objects like Aeroplane and Helicopter, it uses different method to fly.

**PERSONAL INFORMATION**
Date of Birth :04.06.1971
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**ACADAMIC INTERESTS:** Design, Cad, Quality Control, Energy conversion,Thermodynamics, Fluid dynamics, Strength of Material, Measurement and Instrumentation , Automobiles, Electronics, Electrical and also Manufacturing Engineering.
.
**INTERSTED ACTIVITIES:** To Bring innovative and creative Ideas in All the Branches of Science and Technology.

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|---|---|---|---|---|
| **S.S.L.C** | St.Anthony's School Bangalore | 1987 | 70.33 | First |
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| **B.E.,(Mech)** | P.E.S.College Of Engg Mandya Mysore University | 1994 | VIII SEM 68.33<br>VII SEM 68.86<br>VI SEM 61.00<br>V SEM 60.00<br>IV SEM 57.20<br>III SEM 56.90<br>II SEM 64.30<br>I SEM 61.82<br>AGGREGATE62.30 | First |
| **Diploma in Computer Application** | N.C.C.T Bangalore | 1995 | 82.00 | First |
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| **Diploma in Computer Hardware** | N.A.I.I.T Bangalore | 2004 | 62.00 | First |

KNOWLEDGE OF COMPUTERS:

Operating Systems : Dos, Windows, Unix
Programming Languages : C,C++
Packages : Autocad R14,Cable Cad, Oracle, MS Excel, MS Word, Small World, Lotus
Elective in B.E : CAD/CAM, Work study