

## ANALYSIS OF FLYING BIKE

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### ABSTRACT

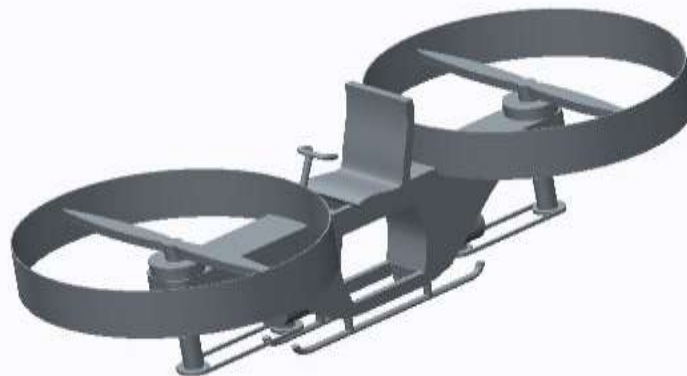
Flying Bike vertical take-off and landing (VTOL) type machine which also follows Newton's third law. It is thought of as a conventional type of aircraft with special features added to enable it to rise vertically during take-off and to land from a vertical descent. It flies with two propellers located at front and back side. These propellers are having hovering abilities. The vehicle is controlled by tilting the propellers by using lever mechanism. Rotation is carried out by difference in speed of propellers.

### INTRODUCTION

Today's aerospace industry focuses on two primary areas: transportation and military. The transportation sector focuses on designing larger, more efficient, and more reliable aircraft. The military focuses on designing more effective, maneuverable, and deadly weapons. There is also a private sector in the aerospace industry. Small single engine planes, new helicopters, and other unique flying devices all fall into this category. Beyond the private sector, there are also several commercial applications that could benefit greatly from the hover-bike/flying bike.

Flying Bike is defined as a combination between a motorcycle and a hovercraft. Ideally, such a vehicle would be able to allow people to navigate the earth in a new and unique way. A well-designed hovercraft would be able to take off and land vertically, maneuver slowly through tight spaces, and hover in place.

Flying Bike is a vertical take-off & landing vehicle take off and land vertically. First it take-off from the ground vertically, and after that the tilt propeller mechanism is used for the transition from vertical to horizontal flight. It consist of two propellers to lift the bike and this are mounted on front and back side. Two engines are used to provide required power for propose of propulsion of propellers.



*Fig 1 :Creo Design of Flying Bike*

### CONSTRUCTION OF FLYING BIKE

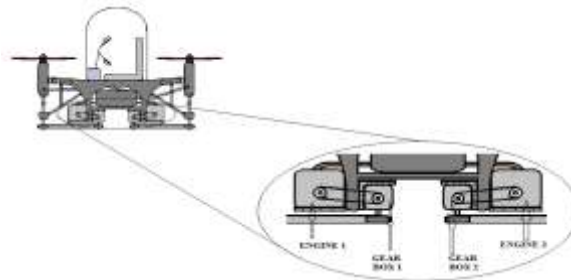
Flying Bike consist of following main part are;

#### Chassis

Chassis is a main part of any automobile or aircraft; which provides support to all the other units which are mounted on it. Chassis of Flying Bike is made up of Pressed Steel. Length of chassis is 2.5m. It provide support to propeller housing, tilting mechanism, engine, gearbox, propeller shaft, etc.

#### Engine

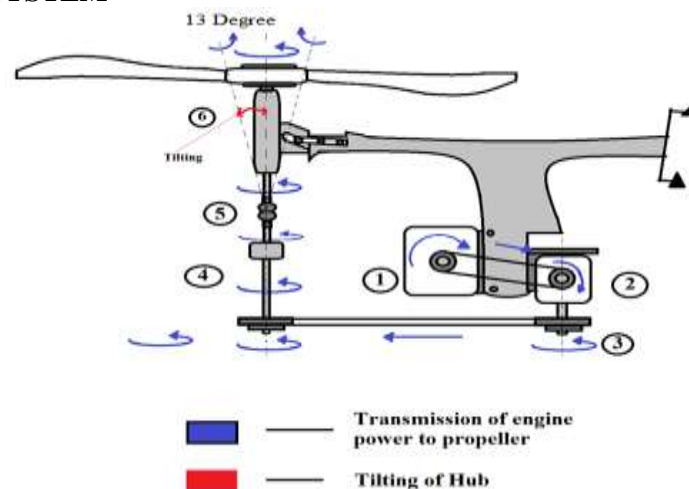
An engine is a power generating machine, which converts potential energy of the fuel into heat energy and then into motion. It is S.I engine and its power is utilize to run propeller.



**Fig.2.3. No. Of Engines Used In Flying Bike**

In the above figure shows the transmission arrangement of the flying bike. In this we use two 100cc petrol engine mount opposite to each other on the chassis. We use two engine power and transmit that power to the propeller by spiral bevel gear box. Gear box transmit the engine power perpendicular to the 6 ratio to the propeller.

### TRANSMISSION SYSTEM



**Fig.2.4. Transmission System**

Chain drive is used to transmit power from engine to spiral bevel gear for perpendicular power transmission. Sprocket is mounted on output shaft of engine and also on input shaft of gearbox. Chain is placed on the sprocket for proper motion transmission. The main function of spiral bevel gear is to change the plane of rotation in perpendicular direction

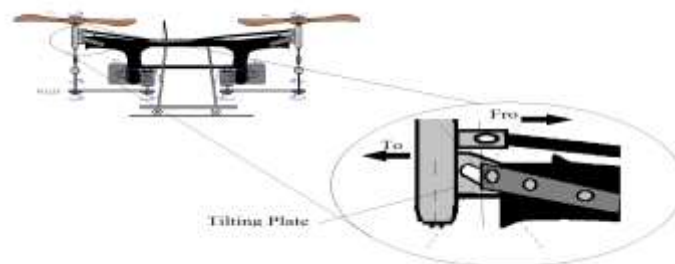
Belt drive is used to transmit power from gear box to fixed shaft which is connected with propeller shaft. Belt drive transmits power to fixed shaft. It is vertical shaft connected with propeller shaft by means of universal coupling. It is fixed by housing for no deflection. It rotates by using belt drive and transmits power to propeller shaft. Coupling used for rotational motion with angular movement. This is used to provide tilting or angular movement for propeller shaft during forward or backward motion. It is passed through housing which supports the propeller shaft with thrust bearings. Propeller is bolted on hub which is connected with propeller shaft.

## PROPELLERS

A propeller is used for providing a force or thrust at the expense of power generated by engine, for driving a Flying Bike on air. Propellers are rotated in opposite direction for providing the anti-thrust. The lesser the number of blades on a propeller, the more efficient to propel, and it consumes less power. The more blades having the more blade area there is to create more pressure for lift. Two blades give plenty of area for lift, and keep it an efficient design.

The diameter of propeller is 51 inch. It is crafted from beach wood material with polyurethane coating, work at 3500 rpm. It is statically and dynamically balanced and each propeller carries maximum 110 Kg load. It is bolted on hub and is connected with tilting shaft as shown in fig. This shaft is connected with mainshaft by using universal coupling. Main shaft is driven by engine.

### Tilting Arrangement:

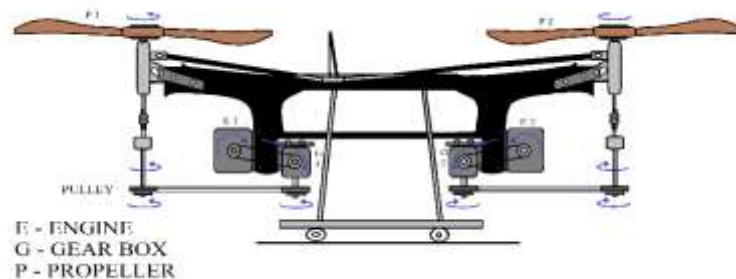


**Fig.2.20. Tilting Arrangement**

The above diagram shows the tilting mechanism of propeller housing. The housing is attached to the chassis by means of hinge joint, and the housing is tilted 15°. The tilting of the propeller housing is controlled by lever mechanism.

## OPERATION AND WORKING

The power of engine is transmitted to spiral bevel gear box (secondary gear box). It increases the speed of the engine. With the help of belt drive power transmitted from secondary gearbox to fixed propeller shaft. It rotates the propeller.

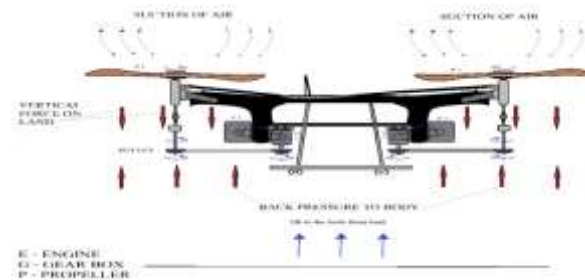
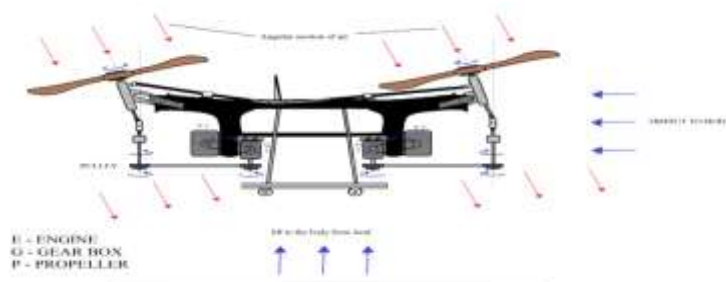


**Fig. Working of Flying Bike**

Operations of Flying Bike:

### I) TAKE-OFF / LAND:

This operation is based on Newton's Third Law. When propeller rotates at high speed it creates pressure difference. It forms low pressure region above the propeller and high pressure region below the propeller with respect to increment in speed. Due to this phenomenon Flying Bike gets vertical take-off. The landing and take-off is done by change in speed of propeller.

*Fig. Take off***II) AXIAL THRUST:***Fig.3.4. Axial thrust*

After take-off of Flying Bike, there will be need of hovering of bike. This operation will be performed by changing position of propeller i.e. by tilting propeller to small degree in front or back side. If angle will be small then speed of hovering should be less and vice-versa. The component forces due to which Flying Bike hovers and position of propeller is shown in figure. Above motion are based on Newton's second law. When the both propeller tilt, the forces that act on the Bike are shown in the diagram above. Initially the propeller housing is at vertical and for thrust the propeller housing tilt at  $15^\circ$  in forward direction. Two propeller will tilt using propeller tilting mechanism and this is how the Flying Bike accelerates in the forward direction thus moving to horizontal flight.

**III) TURNING OF FLYING BIKE:**

Turning of Flying Bike is obtained by changing the speed of propellers. Due to difference in rotational speeds of propeller Bike will automatically turn. This difference is created by accelerators of bike manually or automatically. To stabilize the helicopter anti torque rotor will be given on its tail side. This difference in speed is not much large, because then there is chance of unbalance.

**APPLICATIONS**

1. Civil and military medical evacuation.
2. Relief transport in case of a disaster (floods, earthquakes, etc.).
3. During travelling less time consume
4. Aerial Photography & Video.
5. In rescue operations.
6. In Transport missions the transport aircraft which are replaced by the flying bike when it is necessary to use very confined or unprepared ground sites.

**CONCLUSION**

Flying bike is a new innovation which is new trend for travelling and approaching to destination replace by heavy vehicles. It is also helps to reach our destination as soon as possible by saving our time on space not as like on the road which is full of traffic and vehicles etc. It is also eliminate the chances of accident as compared to road which we are seeing in daily life. And also it will use for multi-purpose as replaced conventional vehicle by Flying Bike.