

## Investigation of Issues in designing and development of an overhead Bike

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### Abstract

This paper discusses an overhead bike which brings the Revolution in automobile and aerial vehicles. This bike is meant for commercial use and defence i.e. during rescue operations, spying and lifting a person to a higher altitude etc. This new concept replaces the engine by a compressor and an electric motor by a turbine motor respectively to provide the necessary thrust to lift the bike along with the person. This replacement will also be economical, ecofriendly and will require low maintenance. This bike is so designed that it provides high maneuverability and better stability.

*Key words:* Hoverbike, Fabrication, Flying bike, Defence and Security system, Solidworks.

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### 1. INTRODUCTION

The Overhead bike is the combination of a bike & a helicopter. This bike is the futuristic flying vehicle which eases the human travel and saves time. The overhead bike has eliminated the fuel consumption as the engine is replaced by a compressor and the electric motors are replaced by the Turbine motors. Our main concern for this bike is to be light weight, human comfort, ease in operation and control. So keeping this in mind we have tried to give it better stability by using light weight materials and proper balancing. It consists of four propeller blades which would provide a maximum thrust equal to the sum of its own weight and the average weight of a person. The main component of the bike is its compressor which is powered by the battery; once the compressor starts its work to produce necessary air pressure which is used to rotate the blades mounted on the turbine. The compressed air pressure is enough to produce the necessary effect on turbine through which a starting torque and maximum rpm are generated ( $P=TW$ ).

### 2. Literature review

As from the literature survey the concept of Hoverbike was built by Chris Malloy. Mr. Chris Malloy started out as a hobby, but quickly grew into a commercial enterprise, with interest from people and groups from industries and farmers. There have been a lot of researches based on this concept but despite of that there are only few projects that were successful and are practically in work. Some of the previous studies and work related to our concept are shown in the table 1-

**Table 1 Present the summary of literature studied**

Sr.no	Year	Author	Work done
1.	2015	Colin Furze	He simply uses two engines at the front and at the back to provide necessary thrust to the bike for lifting but somehow it comes out to be costlier and also not so ecofriendly. In Colin's bike there is no direction control i.e. that a person can only lift the bike above the ground but cannot turn it towards any direction as per their will.
2.	2011	Aero-x	Aero-x also uses the engine and the rotor blade to lift the bike they have installed the vanes above the blades for direction controlling but the cost of the aero-x bike is such high that it is not feasible to use it commercially.
3.	2017	Hover surf	This Russian company has invented the flying bike and named it scorpion. They use four electric motor powered by the battery such that it is capable of flying at 40mph with maximum travel time of 25 minute. They use rotor angle to through electronic mean for direction control.

**3. Problem description**

Based upon the literature review It is seen that the main problem comes during this type of bikes are there weight, stability, Turning radius, direction control, Altitude up to which it can lift at two person weight without any deformation and strength of the vehicles under various condition. There are following consideration

which should be in consideration for an engineer while designing such type of vehicles.

- **Weight:** - As this is biggest challenge for an engineer to design a flying vehicle with light weight and minimum cost. The light weights of such vehicles help it to lift easily and a low load on the motor i.e. These types of vehicles require the 50% more thrust in additional to their weight so less the weight of vehicles less the amount of power require.
- **Stability:** - Such vehicles should be highly stable because stability in such vehicles is necessary to prevent any accident and provide smooth and comfortable ride to the pilot.
- **Direction control & Turning Radius:** - It is easy to lift the vehicles as compared to give direction to flying vehicles in air when there is absence of friction and road surface. As during normal bike riding on to ground by controlling the handle of bike we can easily take a sharp turn without any misbalancing but when it comes to take turn in air the vehicle should be well calibrated and there should be proper propeller angle for turning the vehicle. For turning the bike we can either use yoke or roll mechanism or either we can turn by varying the speed of propeller.
- **Altitude:** - lifting the vehicles to certain altitude and maintaining the same height because we know that such type of vehicle work on the principle of Newton's third law of motion.

**4. Methodology**

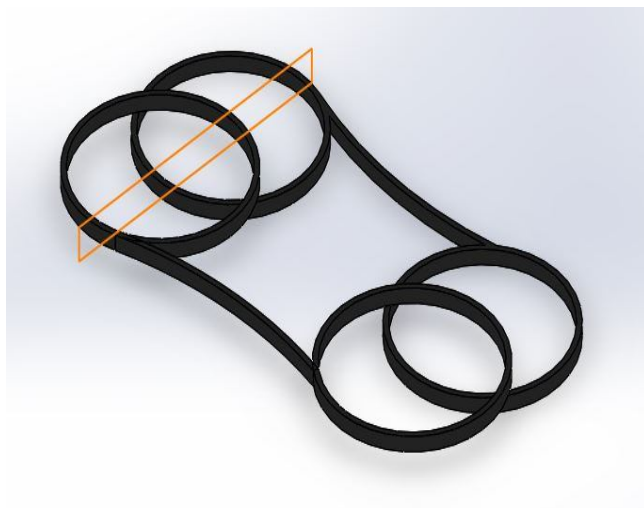
The flying bikes are similar to Quad copter except that in the over bike a person with weight can be lifted to some altitude. In this over bike we design it so compact, stable, ecofriendly and economical so that it can be used for commercial and defense purpose. In this bike we mount the propeller to one another to get high thrust and which provide better balancing to the bike. We use Turbine instead of electric motor upon which propeller is mounted. Tesla turbine is compressed air operated coming from compressor.

And the compressor is powered by the LI-ON Battery because by this arrangement bike will travel up to 1 hr. or more. And when it comes to turning the bike to desire direction it can be done by varying the speed of front two propellers. It is our first priority that the bike should be easy to drive or easy to handle. Table 2 shows the dimensional details of the bike.

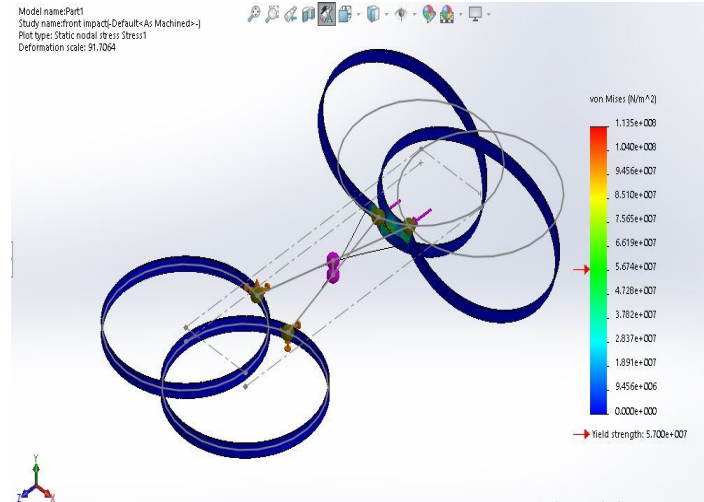
**Table 2 Dimensional Detail of bike**

Sr No	Part Name	Dimension	Unit
1	Propeller assembly	0.75	Meter
2	Connecting frame	0.8	Meter
3	Propeller blade	0.72	Meter
4	Total width	1.125	Meter
5	Total length	2.25	Meter

The frame design developed took a simplistic approach. The main ideas taken into consideration were the housing of the motor and the propellers, a place for the rider to sit. We are using aluminum square tube of total length 2.25Meter and total width 1.125 meter. The initial design of the bike is shown in fig.1



**Fig 1 Design of over head bike**



**Fig 2 Analysis of over head bike using solid works**

**Conclusion**

The purpose of this paper is to focus the overhead bike which is new generation bike. In this paper frame analysis and the problem comes while designing the flying bike is consider. We also specify the efficient turning of bike and the different type of method which will apply for it. We also concluded that the vehicle can lift and land easily in different condition and it is for efficient than that of the normal vehicle. It can be easily used for commercial and defense purpose such that it will gives the new strength or power the defense system. It will help the defense person to don't directly interface the danger areas/militant areas.

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