

# **Proposal for Hovercraft Design**

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## **Introduction**

The definition of hovercraft is “A vehicle which can hover over land and water surface with the help of air cushion underneath its body also known as an air cushion vehicle.” Upcoming paragraphs of the proposal will include motivations, project summary, problems faced, solutions and conclusion.

## **Motivation**

The reason we find it interesting is our common interest in vehicles. We previously thought of making a RC car but later on found hovercraft to be more interesting. As it is a versatile vehicle, which travels on land, water bodies and other surfaces. It is also a latest addition to vehicle industries.

## **History of Hovercraft**

Hovercraft was invented by Christopher Cockerell in 20<sup>th</sup> century. Earlier in 1956 air cushions were invented and using the idea of air cushions Christopher took a step forward to make an air cushioned vehicle and named it hovercraft. Hover-craft which means it can hover on all surfaces and craft that is the main base of the vehicle.

Christopher Cockerell used some old inventions of air cushions and modified them in making an air cushioned vehicle and named it as Hovercraft. It was modified in 20<sup>th</sup> century. After lots of failed attempts, he first used air cushion and developed a successful skirt or say base for the hovercraft. It was first used for military and was available for public in early 21st century. There is no vehicle invented similar to hovercraft till date.

## **Project Summary**

In general, the project will first start with craft, a plastic tube attached on the sides. The craft will have 2 or more motor/engines on the top of it. Motors will provide the power to keep the body afloat and move ahead. Later Arduino will be connected with the frame and other electric components. In the beginning there will be temporary connections and untidy assembly of components. Later when the test runs are complete and the project is ready, components and wiring will be completed with perfection.

## **Project Details**

Arduino software will be used for writing the code and uploading it to Arduino-UNO that operates all engines/motors. Two batteries will be used, one to power Arduino-UNO and second one to power other components of the hovercraft. An Arduino USB host shield is a device which will be connected to Arduino-UNO. This helps to connect any USB device to Arduino-UNO. This will allow any controller to control hovercraft. A bullet shaped board will be used as a craft/base. This board will have a hard square-boxed panel mounted on the top it, to hold one of the motor/engine that will allow the hovercraft to move forward. This panel will be a little extended to the end allowing it to be attached with flaps. These flaps will be used to give the desired direction to the hovercraft. These flaps will be interconnected with each other and powered by a servo attached to the circuit. There will be an outer skirt made from plastic that makes the hovercraft float when it is inflated. This plastic skirt will be glued or attached to the border of the craft/base. A smaller board is installed under the main board in a way that the plastic will have some extra space to inflate.

## **Project Problem/Solution**

### **First Problem**

The hovercraft can travel both on ground and water. Out of all the implementation, the challenge faced while making of prototype of the hovercraft was to protect the circuit from splashes of water and dirt. Earlier the fan providing upward thrust was directly installed on the craft, blowing air to the surface which created splashes of water and dirt. To overcome this problem, one more board smaller in size than the craft board was added below the craft board. This made a hollow space in between these boards. Now the motor blows air to the hollow space between the boards, saving the circuit from the splashes.

### **Second Problem**

Earlier we used permanently inflated skirt to keep the hovercraft floating on the surface. This became a question of durability of the material used for skirt. As a new board was added under the craft replacing permanent inflated skirt with a piece of plastic attached to both the boards. The air is now blown in the hollow space between the boards and inflate the skirts. When the motor turns off, so it stops blowing air in the hollow space resulting it to deflate itself. We will try to cover the top of the motor by a plastic shaped dome with holes in it, so that it can reduce the air lose and keep the air inside the hollow area while functioning of the motor.

## **Extra Feature**

The hovercraft would be powered by solar cells. Small solar cells will be used as a wall to cover all the exposed parts of the hovercraft. It will also provide renewable source of energy to power banks used to power hovercraft. As the power banks need to be charged, every time it runs out of energy. The solar cell will help to charge the power banks helping the hovercraft to work for a bit longer.

This feature is subjected to change.

## **Conclusion**

The hovercraft consists of Arduino-UNO, Arduino USB host shield, two motors, flaps, plastic skirt and two boards. Both motors help hovercraft to inflate the skirts, lift itself and also to move forward. Flaps gives direction to the hovercraft. The USB host shield will help to control the hovercraft. The problems which we faced in the project helped us making the hovercraft even better. The permanent inflated skirts were replaced by inflating and deflating skirts. The devices which are supported by USB host shield are PS2, PS3, wireless mouse, wireless keyboard or a mobile phone to control the speed and direction of the hovercraft.