What is a hovercraft ??
A vehicle capable of travelling over surfaces on a cushion of slow moving, high-pressure air.

The air is ejected against the surface below and contained within a skirt.

A propeller in the vertical plane used to provide the thrust, to move forward.
Real Hovercraft
• Definitions & Terminologies
• Forces on the craft
• Types of RC hovercrafts
• Hovercraft Controls
• Skirt Design and Lift Generation
• Propulsion design
• How to make your hovercrafts (motor mount, servo mount)
• Duct designing
• Few other designing tips
Basic Terminologies
Forces on Hovercraft

Basic Principles of the Hovercraft: The Momentum Curtain effect
• Propeller motor system in the vertical plane produces thrust.

• Thrust mechanism can also be integrated with the lift mechanism of the craft.
Types of Hovercraft

Single propeller Hovercraft

Multi propeller Hovercraft
Lift and propulsion mechanisms integrated.
A vertical/slightly inclined motor propeller system.
Duct provided to push some amount of air through below the mainframe into the skirt.
Efficiency depends on better duct designing.
Lift dependent on thrust.
Maximizing air flow for lift, not compromising on thrust.

Can it hover at a place???
Multi propeller Hovercraft

- 2 different motor-propeller systems for Lift and Thrust mechanisms.
- Has the ability to hover at a place!
- Amount of lift independent of the amount of thrust.
- Horizontal plane - lift mechanism.
- Vertical plane - Propulsion mechanism, integrated with controls.

*Generally used for large scale purposes.*
Controlling

- Speed i.e. throttle depends on the rear vertical motor.
- In case of single propeller crafts, it affects the lift too.
- **Rudder** attached, behind the thrust motor to maneuver.
- **Thrust Vectoring** can also be used.
- **Twin thrust motor** with/without rudders are also used.
- Any other mechanism you might think!!!
Twin motor Hovercraft
Hovercraft’s skirt

- Skirt is made of cloth type material which does not allow air to leak through it.
- Used to contain high pressurized air
Hovercraft’s skirt

- Notice the curved side parts to give it a wrinkleless blown up shape.
Rudder Assembly
How to make R.C. Hovercrafts in the Workshop?

✓ Overall dimensioning
✓ Designing (making a plan)
✓ Part dimensioning
✓ Duct designing
✓ Get it verified from your guide
Paper work

Top View
Paper work
Paper work

Front View
Construction Materials

- Coroplast - main structure, rudders, duct
- Styrofoam - skirt boundaries, duct
- Wood - motor mount, rudder structure, strengthening
- Adhesives - Bond Tite, Bond Quick, Tape

Caution: Strengthening only where required.
Duct Designing

- Proper intake area
- Back should not be perpendicular to the craft board (Why so??)
- Below the duct will be the passage for air to go below.
- Rudders will be mounted on the duct

*Total airflow should be well divided between lift and thrust!!*
• Styrofoam sheet boundaries will be attached to the main-board boundaries below the craft.

• A coroplast plate-type structure can be provided just below the duct to ensure air goes elsewhere in the skirt also.
Motor and Servo Mount

- Motor to be mounted **ON** the duct front face.
- Servo can be on/at the side of the duct.

*Remember that servos and motors are temporary. Keep that in mind while designing their mounts.*
Electronics required

- 1 Motor
- 1 Propeller
- 1 Servo
- 1 Battery
- 1 ESC
- Transmitter - Receiver

All these will be mounted on the craft only at the end of the workshop, during testing and removed back after the test.
Few Other Tips

- Remember: its *Aeromodelling... so weight matters*.
- Motor mount should be strong.
- Try side walls, if time permits, to maximize air intake.
- Ducted Fans can be used for better performance.
- *Any thing that increases air intake can be implemented.*
Thank you!
Contacts

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