



# Wolfgang Robotics

## Chandler High School Wolfgang Robotics

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# Wolfgang Robotics

## Abstract

The Chandler High, Wolfgang Robotics team, has designed an ROV to enter into the 2007 NURC competition. The new vehicle was constructed to be aware of its surroundings through visuals and audio.

This vehicle has four mounted cameras enabling its driver to have a good sense of his position. Alongside the four cameras are lights which allow drivers to have the ability to operate in dark conditions.

Audio is one of the main features of this new ROV because it features a waterproof microphone. The microphone is sound waves traveling in the water making it a great feature, and giving an extra sense to the robot.

Alongside Audio, video is a more important feature. As the ROV is able to look around in four different places. Looking for artifacts during the mission will be made easy thanks to this feature.



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## Design Rational

### Propulsion System:

The vehicles propulsion system is made up of a total of four motors that are attached to propellers. Two motors control the vertical thrust, and the rest control the horizontal thrust.

The motors controlling the vertical thrust are both attached to the same speed controller. This is so both motors are synchronized and give off the same amount of thrust at the same time.

Motors which control horizontal thrust work in a different manner. First of all both of them are not attached to a single speed controller. Each is attached to its own speed controller and can be operated separately by the driver. This is so the vehicle may spin. The motors are set up in a fashion similar to the tank style drive train. Importantly, the motors face away from the center of the ROV in order to produce an effective water flow that enables the ROV to turn quickly.



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## Design Rational

### Visual, and Audio Systems:

The design of the ROV incorporates four video cameras. The video cameras at an inch and a half in size, are housed by PVC unions and clear sandglass windows that protect them from water.

Functioning at night is made easy with four LED lights incased in casting resin. The resin is a feature that protects the lights from water damage, and in some ways seem to amplify the light.

The lights are strategically positioned to light the fixed field of view of each camera which has a ninety degree angle.



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## A Unique Challenge

The team faced a unique challenge during the design of the ROV's underwater microphone. The necessity of a microphone came to the team because of the need to hear a Morse code message from a sonic pinger which is a mission prop from the competition. It was challenging to come up with the right liquid to enclose the microphone in, in order to protect it from the surrounding water. The liquid that was finally decided upon was mineral oil.

In the end the oil transferred sound well and did not damage the microphone. Its solid aluminum casing which holds the oil and microphone also helped in transferring sound which made this speaker the perfect device to transfer sound.