

2004 TAIWAN INTERNATIONAL SCIENCE FAIR

CATEGORY : Engineering

PROJECT : Sub-Explorer

AWARDS : Engineering First Award

SCHOOL : Morrinsville College

FINALISTS : Steven Mc Cabe

COUNTRY : New Zealand

SUB EXPLORER

I came up with the idea to build a small submarine after researching the internet and discovering the problems in which divers had to face in dangerous and time consuming tasks.

The Remotely Operated Vessel (ROV) was designed to perform hull inspections on boats to look for hull damage and leakage of contaminants such as oil or other chemicals into the water. Search, rescue and recovery, are also common tasks which need to be carried out by the police when searching for objects and items.

The ROV has been constructed at a reasonably low cost for submersing in depths down to 10 metres. It is remotely operated therefore needing a tether cable to link up between the computer and the vessel. I built a computer case-top from parts that I already had to eliminate the need for an expensive laptop. A program that I wrote in QBASIC interprets input data from the operator and sends out signals to the various operations on the vessel such as to dive, surface, propel, etc.

The entire project consisted of five individual technology processes. Key processes such as Propulsion, Maneuverability, Dive & Surface capability, Imaging system, and the Control system. Each process required a cost effective and practical solution but still needing to function efficiently and be low maintenance. Through continuous testing and trial & error I feel I came up with the best possible solutions with the limited amount of time and money I had to spend.

I wouldn't have got as far as I have without the help and support from friends, family and local businesses. They helped with ideas and advice from time to time, help with funding, and the sponsorship of materials and tools.

Now that the ROV is complete, I have been able to trial and test it in a swimming pool. Apart from discovering a few minor leaks in the hull and 'bugs' in the computer program, I was able to witness the success of the vessel under operation and find any improvements that could be done to make it work better in future. With further more tests at greater depths the ROV will soon be at the stage where it can perform hull inspections of boats and find lost objects and items underwater. I feel it has the opportunity to be a marketable device to underwater industries all over the world.

Steven McCabe