## What Is It?

The ARV is a highly configurable boat that can autonomously "sweep" the entire surface of a body of water. The goal is to create a platform that many different researchers and security officials can use to collect a large amount of oceanographic data with whatever sensors they require. The ARV could potentially be used to patrol bodies of water and detect harmful substances or activities.
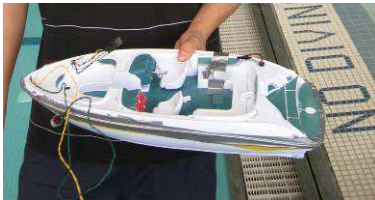
The ARV sports a powerful microcontroller coupled with a sonar sensor in a small, maneuverable boat powered by twin propellers. The microcontroller has a number of ports for connecting to and powering the end user's sensors, and a production ARV would be designed to spend weeks patrolling and searching without human intervention and be able to tag information with GPS coordinates.

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**Project Website:
http://koala.ece.stevens-tech.edu/sd/archive/07F-08S/websites/grp14/**

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2008 Senior Design
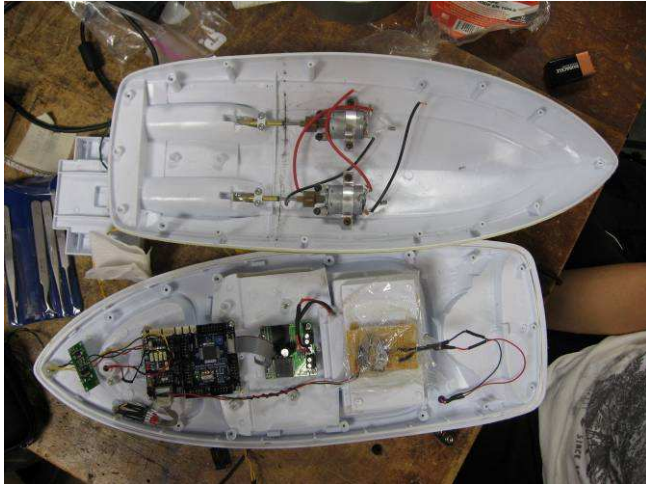

Autonomous Research Vessel

ECE Group 14

Ahmadnizam Isa

Dae Lee

Cesar Yunda

Elias Zakkak

Advisor: Professor Yan Meng

The ARV with its Top Off: Note the motors, (top), and from left to right the sonar, the microcontroller, motor driver, and voltage regulator, (bottom).

Building the ARV

Starting with a gutted toy radio-control boat, the team added a PIC18f8722 microcontroller. This particular microcontroller was selected for its memory, large number of I/O pins, and dual serial ports, (one for communication with a laptop and the other for possible GPS).

Sonar allowed the ARV to detect obstacles and walls and adjust its path accordingly.

A VNH2SP30 motor driver was implemented to provide power to the high-current motors, and was powered directly by a 9.6V rechargeable battery. Finally, the voltage regulator provided power to the microcontroller and sonar.

The ARV was programmed in C using the MPLAB IDE software and CCS compiler.

Testing

The ARV was tested at the pool in the Schaefer Center.

The Team

From left to right:

Elias Zakkak – CPE

"I will never work with microcontrollers again. Ok, maybe."

Cesar Yunda – EE

"Obstacles can be overcome with dedication and hard work."

Dae Lee - EE - **Team Captain**

"I enjoy playing sports and doing outdoor activities. SD has taught me to be patient and appreciative."

Ahmadnizam Isa – EE

"This has been a really great experience and learning process for me; from four different cultures, four different individuals."