ABSTRACT

Detecting the underwater object with Sound Navigation and Ranging (SONAR) in various fields such as fisheries, maritime, oil and gas industry, and autonomous underwater vehicles. SONAR is needed for detecting the underwater object for a larger area by determining object characteristics (e.g. The object sizes and the object types). This thesis also uses a 1-Dimensional technique to identify the underwater object visual information such as the shape of the object. SONAR is a technique for detecting objects that are buried under the water surface by using the sound signal that is reflected on the object to locating the object and knowing the shape of the object.

This thesis is to observe a SONAR system on detecting the underwater object by obtaining information on the object distance and the object dimension to the data processor. The object detection experiments with different distances are conducted on water medium at Situ-Techno and swimming pool of Telkom University. The objects are alumunium and ceramics. The working frequency of the AJ-SR04M module with a fish finder transducer sensor is 40 KHz with a minimum detection distance of 20 cm and a maximum distance of 800 cm. To use the sensor, we must program the sensor on the microcontroller.

By the performance of underwater object detection at finding the information of the object position distance and the object dimension. The first experiment will show the sensor accuracy value on detecting the object by comparing the actual distance with the reference distance to the object is capable to detecting the object position distance with accuracy level for alumunium position distance is around
92.85% to 98.73% and for ceramics is around 84.61% to 88.71%. The second ex- periment will show the dimension of the object we should determine the horizontal plane and the vertical plane to know the shape of the object and the inclination angle between the first sensor and the second sensor on alumunium is around 21.30° and for ceramics is around 22.60°.

Keywords: Underwater Object Detection, SONAR, Arduino Mega 2560, AJ- SR04M Waterproof Ultrasonic Module.