Int. J. on Recent Trends in Engineering and Technology, Vol. 8, No. 2, Jan 2013

Development of Subsea Altimeter Sensor System (SASS) Using Portable Sonar Sensor Fish Finder Alarm for Unmanned Underwater Vehicles

M.S.M.Aras[1]* , A.S.Mohd Nor[1] , S.S.Abdullah[2], Rashid M.Z.A[1], A. Jamali[3]
[1]Faculty of Electrical Engineering, Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, 76100 Durian Tunggal, Melaka Malaysia.
Email: shahrieel@utem.edu.my, arfahsyahida@utem.edu.my, zamzuri@utem.edu.my
[2]Department of Electric and Electronics, Malaysia-Japan International Institute of Technology, Universiti Teknologi Malaysia, International Campus Jalan Semarak, 54100 Kuala Lumpur, Malaysia.
Email: shahrum@fke.utm.my
[3]Department of Mechanical And Manufacturing Engineering, Faculty of Engineering, University Malaysia Sarawak, Jalan Dato' Muhammad Musa, 94300 Kota Samarahan, Sarawak.
Email: annisa@feng.unimas.my

Abstract—This paper describes the development of Subsea Altimeter Sensor System (SASS) for Unmanned Underwater Vehicles (UUV) Application using portable sonar sensor fish finder alarm system. Altimeter Sensor system is used to measure the depth of water. This altimeter sensor design valid for shallow water depth ranges maximum 100 m. This SASS will be applied to Underwater Remotely Operated Vehicles (ROV) design to verify the SASS performances. Experiments conducted to measure a depth of lab test, swimming pool test and Ayer Keroh Lake test. The experiments conducted in lab pool and swimming pool to measure and estimate the error and accuracy of SASS performances because of known the depth of water. The error of Altimeter Sensor System is 10% or ± 5 cm depth and accuracy of SASS very high about 90% for the both experiments. The results on Lake of Ayer Keroh at certain point can be acceptable. The 3D design of seabed mapping is plotted using MATLAB and Excel.

Index Terms— Altimeter Sensor, Sonar Sensor, Fish finder, Remotely Operated Vehicles (ROV)

I. Introduction

An altimeter is an instrument used to measure the altitude of an object above a fixed level. The measurement of altitude is called altimetry, which is related to the term bathymetry, the measurement of depth underwater. Portable Sonar Sensor Fish Finder Alarm Transducer (KFW 333) is used to measure the depth of water and localization of fish as shown in Figure 1. This product is especially designed for amateur and professional fisherman alike, to find out the location of fish and depth of water. This product can be used in ocean, river or lake and is fantastic for detecting schools of fish in any particular area and can shows the depth of water or shows the seabed of water. This device sends a sound wave into the water by way of the transducer. The sound wave reflects off an object such as a fish, or the bottom, and is detected by the transducer also. These echoes are interpreted by the fishfinder and sent to the display. This simple process can provide with us a wealth of information about the unseen region below the water's surface. The KFW 333 is a low cost, lightweight altimeter designed for diverse applications in the marine environment.

Figure 2 shows how to use the portable fish finder. Four techniques to using this portable fish finder such as mount on boat hull, add floats, on ice and use a pole to guide the sensor. So, the technique number four will be used but the pole will be replacing with one of types an unmanned underwater vehicle that called it as ROV (Remotely Operated underwater Vehicle) as shown in Figure 3. Added more features will become more expansive. The two major specifications will be used to purchase the portable fish finder such as the transducer and display.

Figure 1: Portable Fish Finder - KFW333

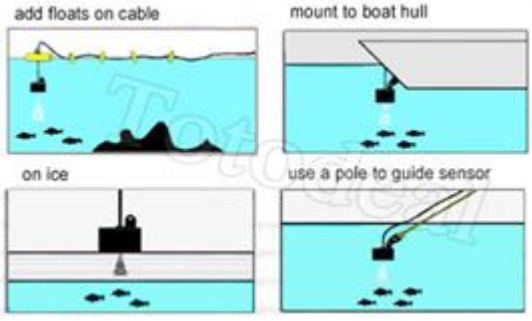

Figure 2: How to use Fish Finder

A. Feature and Specifications

Feature of portable fish finder such as given below, and specifications stated in Table 1.

1) Detect and display grass, short & tall weeds, sand, and rocks on seabed
2) Get the approximate location of fish and the depth of water

DOI: 01.IJRTET.8.2.39