Installing the TSUNAMI Warning System by M.V. SEAFDEC

Anuphap Lorpai

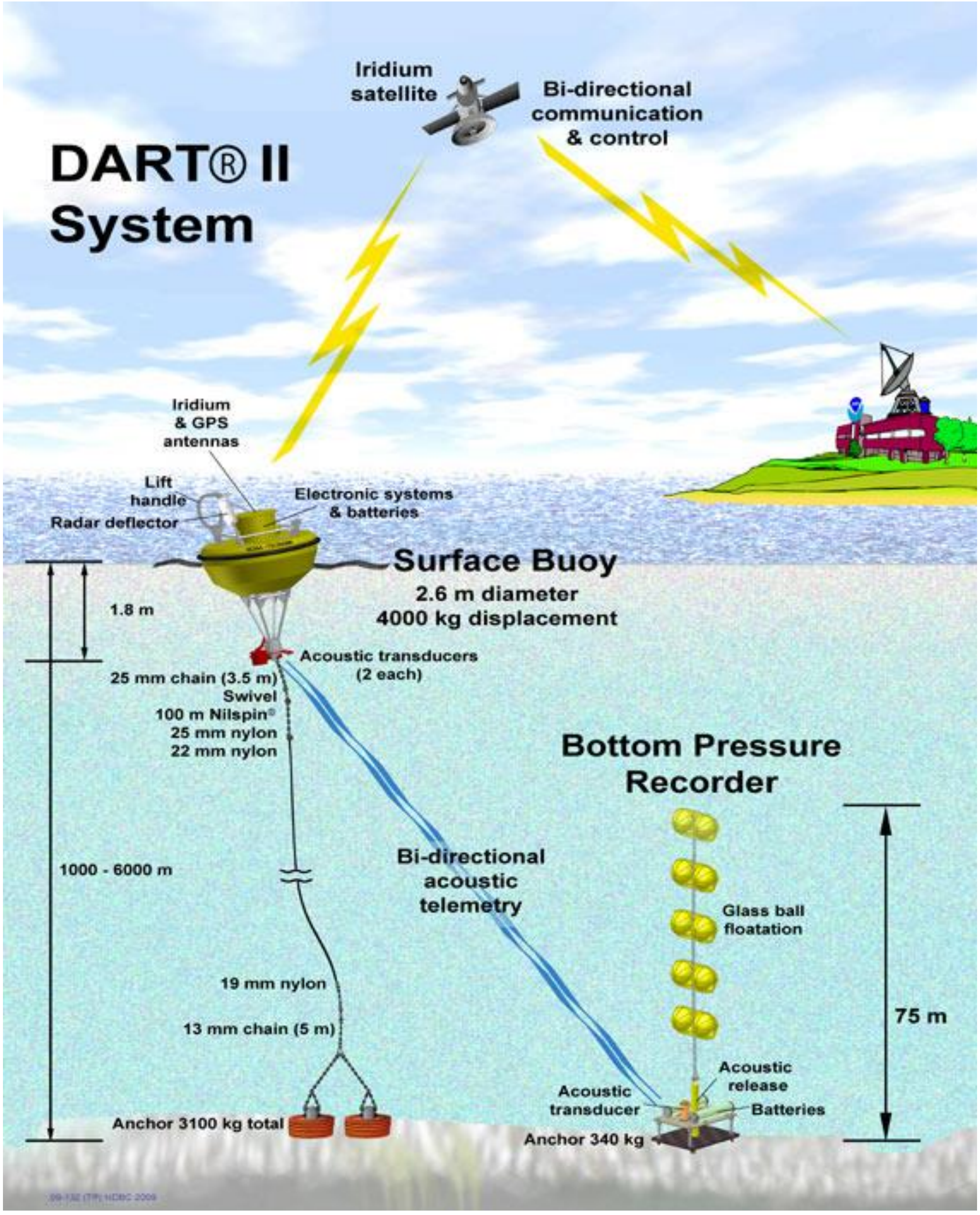
I. Introduction

The disaster in Thailand on 26 December 2004 was impact Thailand's southwestern coast along the Andaman Sea by tsunami. Thai people have never thought before. It happen in the country had lost their entire life. Public property, natural resources, economy Marine ecosystems and landscape an enormous number and difficult recover back to the original. The National Disaster Warning Center Thailand has cooperated to the United States of America's Government, through United States Agency for International Development (USAID) and SEAFDEC/TD to deploy a tsunami warning system in Indian Ocean. Installing alarm systems such action was completed 6 Cruise on Nov, 2006 Dec, 2009 Dec, 2010 May, 2011 Nov, 2012 and Jan, 2014 by M.V.SEAFDEC a vessel of the Southeast Asian Fisheries Development Center to install the system at Latitude 8.5 degrees North, Longitude 88.3 degrees East. Above the west side of Nicobar Island distance 600 nautical miles from Phuket, in the depth 3,515 meters.

II. Methodology

Tsunami warning system in Thailand use of the system (DART II System) The equipment consists of devices used in tsunami warning systems. The base consists of storage and marine buoys, signaling the sea surface called Deep Ocean Assessment and Reporting of Tsunami System (DART). The system detects the occurrence of a tsunami after an earthquake in the Indian Ocean. The process of DART II system. The Real-time tsunami buoy system is comprised of two parts: the bottom pressure recorder (BPR) and the surface buoy with related electronics. The BPR monitors water pressure with a resolution of approximately 1 mm. sea water with 15 second averaged samples. Data is transmitted from the buoy via an acoustic modem, and data is transmitted from the buoy via the GOES Data Collection System. Under normal conditions (no tsunami) the BPR sends data hourly that is comprised of 4 data in 15 minute which are single 15 second averages. The data is reformatted and sent via the GOES self-timed channel and displayed to show open ocean tides. This gives an hourly indication of the health and condition of the entire system. If data are not received from the bottom, the surface buoy uses the GPS derived buoy position for the self-timed message.

An algorithm running in the BPR generates predicted water height values and compares all new samples with predicted values. A complete description of this algorithm can be found here. If 2 data in 15 second water level values exceed the predicted values the system will go into the Tsunami Response Mode. Data will be transmitted on the Random channel (132) for a minimum of 3 hours, giving high frequency data on short intervals with 100% repeated data for redundancy for the first hour. Every GOES transmission will include the time of T=0, which is the time the second out-of-bound value was detected. Every Tsunami Response Model message also includes an ID that identifies the type of data and the time of the data in the message as minutes after T=0. When the time of the hourly self-timed transmission occurs during a Tsunami Response Mode, the BPR will send one-minute data, comprised of the average of 4 data in 15 second, for the preceding 2 hours (120 values). If the ocean is still perturbed after the nominal 3 hours of the Tsunami Response Mode, the hourly self-timed transmission of 120 in one minute averaged values will continue. The system will return to normal mode only after 3 hours of undisturbed water heights.



Installation system DART II is composed of two parts.

1. Deployed Bottom Pressure Recorder (BPR). This machine is located on the current. Pressure of the water changed suddenly. When the tsunami and the transmission of data to the second part of the surface. The installation will be exploring the current and water at different levels. The area will be installed prior to the installation of the system is appropriate. The unit is located within the surface area that can receive signals from the detectors tsunami on the sea floor.
   1. Sensor, CPU and battery
   2. Anchor
   3. Acoustic Release Trigger
   4. Glass buoy
2. Deployed surface buoy for receiving signals from the seas. The buoy has been Data contained within the floating fixture must be tied to a buoy anchored at one end of the cable attached to the anchor at the sea floor. Therefore, it is necessary to explore the depth and nature of the sea floor. The nature of the sea floor must be smooth and not inclined or less inclined.

A survey of the sea floor to note the position of the sea floor and surveyed by GPS. Anchor buoy lines will not be longer than the water depth readings from deep water, but a length equal to 0.985 times the water depth readings from Echo sounder low frequency. Due to the specificity of the motion of the sea sounds. Anchor buoy line is composed of four parts.

1. Chain 1 inch diameter with length about 3.5 m.

2. Wire rope sling 3/4 inch diameter with length about 200 m.

3. Nylon rope 19 mm. diameter with length by formula of
   0.985 x depth of sea.
4. The chain 13 mm. diameter two lines with a length 1.5 m. and 2.5 m. to connection between chain and anchor.

III. Result

After installing the systems have explored the current at different levels. The area will be installed prior to the installation of the system is appropriate. The unit is located within the surface area that can receive signals from the detectors tsunami on the current. Since the installation of such a system is beneficial to Thailand and Indian Ocean, particularly because it can detect the occurrence of a tsunami in the Indian Ocean immediately caused such Tsunami.