Introduction

Due to electromagnetic wave attenuates severely in water, underwater acoustic becomes the most effective transmission media now. According to the development of the deep sea submersibles, acoustic survey devices which are the most effective tools to ensure the submersibles safety, understanding, exploring and developing of the ocean, are widely applied in the deepsea vehicles.

Acoustic Devices

This paper summarizes several frequently-used acoustic survey devices including imaging sonar, positioning sonar, bathymetric side-scan sonar, anticollision sonar and doppler velocity log etc.

![Fig. 1. Single-beam imaging sonar and multi-beam imaging sonar](image1)

Other acoustic devices include underwater acoustic communication set, acoustic phone and etc.

![Fig. 2. Positioning information of Jiaolong USBL](image2)

Analysis

Acoustic survey devices with great depth, wide field, long detect distance, high resolution, great accuracy and moderate price will be the major equipment for the deep sea vehicles in the future. For example, Anticollision sonar is relatively simpler and has high reliability. The develop trend of the anticollision sonar is improving the collision avoidance range in the future.

Typical Applications

Jiaolong HOV is the submersible which is equipped with most acoustic devices in China. It is equipped with a single-beam imaging sonar, two kinds of positioning sonars, bathymetric side-scan sonars, doppler velocimeter log, etc.

![Fig. 3. Arrangement plan of Jiaolong anticollision sonar](image3)

Haima ROV is equipped with a forward-looking imaging sonar and an altimeter.

![Fig. 4. Haima ROV](image4)

4500m AUV is equipped with a imaging sonar, a front anticollision sonar, a DVL and a bathymetric side-scan sonar which has high-resolution.

![Fig. 5. 4500m AUV](image5)

OMAS is equipped with imaging sonar, which can scan for 360 degrees. It is also equipped with an altimeter, which provides the height information of itself. Besides, it is equipped with USBL, which positioning its position in the ocean. A acoustic phone is used for communication.

![Fig. 6. One Man Atmospheric System](image6)

Conclusions

With the development of cognitive and increasing demand for marine, the developing of the deep sea vehicles may towards full deep ocean, collaborative detecting operations in multi-systems. It puts forward higher requirements for the development of acoustic devices with diving capacity and multi-system combined anti-interference ability. Therefore, developments of the full deep ocean, long-distance, high reliability, anti-interference ability of the acoustic devices will become the focus of marine areas in the future.