

The Development of an Autonomous Underwater Drone for Under-ice Survey in the Arctic Ocean

*Shojiro Ishibashi¹, Hiroshi Yoshida¹

1. Japan Agency For Marine-Earth Science And Technology

In order for us humanity to understand the present and the future earth even a little, it is very important to grasp the details about the North Pole. The Arctic is located at the northernmost tip of the Earth and is the base point of the Earth, which is also the movement center. It is also the starting point for various phenomena occurring on the earth. In order to grasp the global environment as accurately as possible and accurately forecast the future environment, it is necessary to elucidate the change of the Arctic and the phenomenon caused by the change. And under that Arctic sea ice and sea ice, there is a lot of valuable information to further accelerate understanding to the Arctic. However, it is also true that the Arctic covered by this wide, thick ice sea is an extreme environment that refuses human approach. In order to understand the true Arctic, it is required to know deeply not only the upper the sea ice but also under the sea ice.

Therefore, in order to obtain various information under Arctic sea ice, the Japan Ocean Research and Development Organization (JAMSTEC) is now developing a new type of underwater platform that will be able to freely navigates under sea ice and performs various observations. We call it as "the Autonomous Underwater Drone "COMAI". In light of operational convenience, "COMAI" is working on making it as compact and lightweight as possible, and it is considered that Arctic researchers are able to conduct "COMAI" easily. Meanwhile, the body is committed to high performance + multifunction, even though it is compact. Advanced technologies that JAMSTEC has cultivated over many years has been incorporated to contribute to innovative sea ice observation.

"COMAI" will visualize the sea ice shape from the "backside" by using acoustic technology and optical technology, and at the same time measure the sea water component under the sea ice in detail using various sensors. Without human intervention, "COMAI" will control all actions by its own autonomous function, and it will accumulate valuable information under the sea ice. In the future, it will be possible to acquire more detailed spatial and temporal information under the Arctic sea ice by making multiple "COMAI" work at the same time or individually.

In this presentation, the concept and outline of "COMAI" are shown and its key technologies are explained with results of sea trials.

Keywords: Under-ice Survey, Autonomous Underwater Drone, Arctic Ocean

