October 2018 to September 2021

Project title | **Development of High-performance Marine Radar**

Institutions：Koden Electronics Co., Ltd.

Project outline

Objective

Ship-mounted marine radar antennas, which consist of multiple antenna elements arranged horizontally to form a narrow directional beam, are rotated by a motor to gather data in all directions to avoid collisions. Therefore, current antennas must be installed in locations that ensure a sufficient radius of rotation. In recent years, there have been calls to expand the scope of use of marine radar systems further by supplementing their radar capabilities with communication capabilities, for example, to share individual ship information.

The goal of this study is to transform the way marine radar is used by introducing phased array technology and new communication capabilities to create a high-performance ship-mounted marine radar system.

Contents

The phased array antenna is constructed by integrating various types of high-frequency circuits such as semiconductor amplifiers and phase shifters into the antenna in a multilayer structure. In current marine radar systems, the antenna aperture (the sharpness and gain of the beam) varies depending on the ship on which it is mounted. In practice, by using sub-arrays as the elemental building blocks of the antenna, the antenna' s performance and transmission power can be selected relatively freely depending on how many sub-arrays are deployed. The objective is to make the circuits smaller and thinner using the bare-chip-based design and manufacturing technology developed for the 1st RFP problem-solving theme, "Development of Solid-state Marine Radar" and then integrate them into a transceiver system for the solid-state radar, which is the end product.