The application of Dynamic Positioning System to Maritime Autonomous Surface Ship(MASS)

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Abstract : 자율운항선박(Maritime Autonomous Surface Ship)의 개발과 도입은 해양 분야의 4차 산업 시대를 이끄는 가장 중요한 기술과 변화이다. 자율운항선박은 해양 사고의 발생 원인 중 가장 높은 비중을 차지하는 인적 요소를 줄이기 위해 인간의 개입 없이 독립적으로 운항하는 선박을 일컫는다. 인간의 개입을 줄이기 위해서는 기존의 선박과 다른 개념과 기술을 개발하고 도입해야 한다. 수십 년 전 개발되어 해상 플랫폼 및 오프쇼어 분야에서 특정 용도로 사용되는 선박 시스템인 동적위치제어시스템은 기존의 시스템에 더해 더욱 정교하고 섬세한 선박의 움직임이 가능하도록 다양한 기능을 제공한다. 최근의 영국에서 제출한 IMO 의제 문서에 의하면, 자율운항선박에는 전통적인 앵커와 같은 선박 설비에 더해 추가로 다른 기술이 적용될 수 있다고 밝히며, 동적위치제어시스템을 명시하였다. 본 논문에서는 이러한 기능 중 자율운항선박의 안전한 운항을 달성하기 위해 동적위치제어시스템에서 적용할 수 있는 요인을 알아보고 제시하고자 한다.

Key words : 자율운항선박, 스마트 쉽, 동적위치제어시스템, 선박 시스템

1. Introduction

Discussion on the development and operation of MASS(Maritime Autonomous Surface Ship) have been actively conducted in the maritime industry including a multiple shipbuilding companies, universities and institutes recently. The IMO Maritime Safety Committee(MSC), at its 98th session, had defined MASS as "Maritime Autonomous Surface Ship(MASS) is defined as a ship which, to a varying degree, can operate independent of human interaction" in order to performing RSE(Regulatory Scoping Exercise), and it was divided into four stage(IMO, 2018). ····(중략)····.

2. Technology and Components of Dynamic positioning system

The dynamic positioning system is a technology which developed for various types of ships to maintain their position and heading for various purposes at sea, especially in the field of offshore plant, or to automatically follow predetermined route and track(IMO, 1994). ····(중략)····.

3. Application to Maritime Autonomous Surface Ship(MASS)

3.1 Maritime Autonomous Surface Ship (MASS)

Maritime Autonomous Surface Ship (MASS) is defined as a ship which to a varying degree, can operate independent of human interaction(IMO, 2019).····(중략)····.

3.2 Technology development in overseas

The European Union (EU) has implemented MUMIN (Maritime Unmanned Navigation through Intelligence in Networks) Project since 2012, with MARINTEK (Norway), Hochschule Wismar, MARORKA (Iceland), Fraunhofer CML (Germany), Chalmers University (Sweden), University College Cork (Ireland) to develop technologies for unmanned cargo ship operations and assess technical, economic and legal feasibility. ····(중략)····.

4. The applicable functions

In order to provide precise and accurate movement in DP vessel, a various of functions that are not provided in

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ordinary ships are provided. Among them, in this paper, it would like to describe three functions.

4.1 DP capability plot

DP capability plot is a crucial tool developed to assess vessel ability to keep position and heading under certain environmental conditions····(중략)····.

4.2 A various type of position reference system (PRS)

The precision positioning data is the most important information in operation of ships. There are several means to determine a position of ship at sea. ····(중략)····.

4.3 Follow target mode

Follow target mode enables the vessel to automatically follow a mobile target in underwater using transponder in HPR system····(중략)····.

5. Conclusion

MASS technology is emerging as a policy and technological trend in the maritime sector in the era of the 4th industrial revolution, and is considered technologies that will bring new paradigm changes in the shipbuilding and maritime sector. ····(중략)····.

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