Paper for Consideration by NCWG5

Symbols for Wing-in-ground-effect (WIG) Craft

Submitted by:	Republic Of Korea (KHOA)
Executive Summary:	This document describes the need of discussing symbols for Wing-in-ground-effect (WIG) craft.
Related Documents:	CSPCWG9-0.87A
Related Projects:	Chart production project for ground effect vehicle by KHOA

Introduction / Background

A ground-effect vehicle (GEV), also called a wing-in-ground-effect (WIG), ground-effect craft, is a vehicle that is designed to attain sustained flight over a level surface (usually over the sea) by making use of ground effect, the aerodynamic interaction between the wings and the surface. WIG craft are expected to have many advantages because they are cheaper than aircraft and faster than ships. Accordingly IMO developed relevant guidelines on 2018.

Analysis/Discussion

Overview of WIG Craft

WIG craft is a multimodal craft which, in its main operational mode, flies by using ground effect above the water or some other surface, without constant contact with such a surface and supported in the air, mainly, by an aerodynamic lift generated on a wing (wings), hull, or their parts, which are intended to utilize the ground effect action.

WIG craft are categorized according to the following types:

- Type A: a craft which is certified for operation only in ground effect. Within prescribed operational limitations, the structure and/or the equipment of such a craft should exclude any technical possibility to exceed the flight altitude over the maximum vertical extent of ground effect;
- Type B: a craft which is certified for main operation in ground effect and to temporarily increase its altitude outside ground effect to a limited height, but not exceeding 150 m above the surface, in case of emergency and for overcoming obstacles; and
- Type C: a craft which is certified for the same operation as type B; and also for limited operation at altitude exceeding 150 m above the surface, in case of emergency and for overcoming obstacles.

Development of IMO guidelines

In order to provide as much guidance as possible to those involved in the design, construction and operation of WIG craft, the Guidelines have been prepared in three parts:

- Part A provides general information applicable to all craft;
- Part B includes provisions that may be subordinate to measures developed through the safety assessment recommendations of part C; and
- Part C details the safety assessments required for all craft.

Interim guidelines for wing-in-ground (WIG) craft were approved by the Maritime Safety Committee at its 76th session in December 2002 as MSC/Circ.1054. (Updated by MSC/Circ.1026)

The interim guidelines were intended to provide as much guidance as possible to those involved in the design, construction and operation of WIG craft.

IMO and the International Civil Aviation Organization (ICAO) have agreed that any WIG craft capable of sustained flight outside the influence of ground effect should also be subject to the rules and regulations of ICAO. Other craft, including those with limited "fly-over" capability, should be covered only by the maritime regulatory regime.

WIG project of ROK and Nautical chart for WIG

Since the WIG craft technology was designated as the core technology on 2012, development of 4 seats WIG and sea trial on 2001, implementation project of large WIG ship were executed. After middle size WIG has been developed, technologies for commercialization have been followed.

Since WIG craft is classified for Ship, it should be equipped with nautical chart. In addition, WIG craft can fly up to 150m, it needs aviation information required in flight mode in addition to nautical chart information.

The aviation information includes flight prohibited area, flight restricted area, airport control zone, nuclear development area, Military operation area, aviation shooting training zone and air defence identification area. Besides, additional information for only WIG craft will be required like take off zone, safe height for navigation, non-returnable area and speed restricted area. A nautical chart should be developed incorporating relevant information for the safe and efficient operation of the WIG craft.

Conclusions

The development of WIG craft technology made sailing the WIG ship in some countries. Accordingly, a nautical chart for WIG craft should be developed to support safe and efficient navigation. In addition to the existing chart information, review of the avigation information and necessary information is required.

Recommendations

For WIG craft, the avigation information and other additional information mentioned in this document should be considered for inclusion in the IHO nautical chart standards.

Action Required of NCWG

The NCWG is invited to:

a. **Note** this paper
b. **Discuss** the need of new symbol for WIG craft