DOCTORAL DISSERTATION INFORMATION

Dissertation title: *Research the capacity of Vietnamese Deck Officers in handling situations at risk of colliding at sea in single watch.*

Speciality: Science of Navigation **Code**: 9840106

Ph.D Candidate: Mai Xuan Huong

Supervisor:

1. Prof. Dr. Nguyen Kim Phuong
2. Dr. Ha Nam Ninh

Educational Institution: Vietnam Maritime University

1. Aims, subjects and scope of the dissertation

Aims of the research: Establishing a model for handling collision risk situations of officers of watch (OOW) in a single watch. Basing on that, developing a support program for decision making of collision avoidance ships, contributing to Vietnamese OOW during performing the duty, as well as serving maritime training.

Subjects of the research:: Situations where two vessels meet are at risk of collision at sea; handling capacity of Vietnam's OOW in a situation where there is a risk of collision; International regulation for preventing of collision at sea 1972; Collisions have occurred in Vietnamese fleets.

Scope of the research: The dissertation focuses on the processing capacity of Vietnamese OOW by experience in a single watch in situations at risk of collision between the owner ship and the target ship at sea in good visibility conditions, specifically as follows: Situation of target ships going in the meeting on reciprocal or nearly reciprocal courses; situations where target ship is crossing so as to involve risk of collision; target ship situations are overtaking. In the above situations, the owner ship and the target ship are power driven vessel, not the vessel under command or vessel restricted in her ability to manoeuvreas prescribed in the convention on the International for Preventing collision at sea in 1972 (COLREG 72).

2. Research method

Theoretical research:

+ Analysis, statistics and aggregation of data;

+ Using modeling method: Applying fuzzy arguments to build knowledge base of collision situations and corresponding collision avoidance actions.

Survey and experiment: Survey, interview leading experts on navigation; build collision situations excises; conduct experiments on the full bridge simulation system with the object of Vietnamese OOW.

Application of information technology: Approach the expert system to develop a program to support the decision-making to maneuver collision avoidance for OOW in situations at risk of collision at sea in single watches.

3. Scientific and Practical signification

***Scientific signification*:**

Systematize the theoretical basis for the cause of ship collision in accordance with international regulation for the preventing collision at sea 1972 and the collision avoidance actions according to law; apply advanced scientific and technological achievements to artificial intelligence. Particularly, fuzzy logic is applied to build knowledge base data sets, process data from which to build mathematical models and decision support programs to help Vietnamese OOW in situations at risk of collision with another ships at sea in a single watch.

***Pratical signification*:**

Competence model of Vietnamese Maritime officers in handling situations at risk of collision at sea in single watch to apply for the training of Vietnamese maritime officers effectively following the international standards; The program to support the decision to maneuver the collision vessel in an at-risk of collision situation in a single watch is a scientific toolkit that allows the processing of collision evacuation data. This tool ensures

science, flexibility, accuracy and stability and helps OOW use the lookout, using navigation equipment, maneuver the vessel to avoid collision follow COLREG 1972 to reduce collision at sea, raising awareness in a single watch at sea.

4. New contributions of the dissertation

The dissertation is an independent research, making new theoretical and practical contributions in the field of maritime science, specifically as follows:

- Building a model of capacity to handle situations at risk of collision at sea in the single watch of Vietnamese OOW to ensure to meet international standards;

- Building Knowledge base situations that are at risk of collisions in good visibility conditions and corresponding collision avoidance actions;

- Formulate a program to support the decision to maneuver collision avoidance ships in situations at risk of collision in a single watch at sea, applicable to Vietnamese OOW.

SUPERVISOR **Ph.D Candidate**

1. Prof. Dr. Nguyen Kim Phuong **Mai Xuan Huong**

2. Dr. Ha Nam Ninh