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The navigation warning receiver simulator is designed in navigation universities Applied research in the popularization

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Abstract

[Objective] NAVTEX is an important chapter in the teaching of navigation information system course, but its teaching content is abstract and involves various content, which is not easy for students to understand. If you can simulate the working process of running NAVTEX in class, it can effectively improve the students' learning enthusiasm and knowledge mastery level. In order to give the navigation students a clear understanding of how NAVTEX works. To solve the problems such as the limited time and space conditions of GMDSS (Global Marine S) training theory and experimental content, improving the professional quality of professional crew, and training significance, and put forward the method of popularizing the design and application of navigation warning receiver simulator to universities.[Methods] Use this simulator to simulate the real Marine NAVTEX, so that students can better participate in the vocational training course.[Results] Through the use of the dual-end education entrance for teachers and students, the purpose of simultaneous teaching practice can be better realized, and the dual purpose of exercise and testing can be achieved by issuing different instructions from teachers, which has the assessment function.[Conclusion] Based on the above factors, it also explains the overall demand of the society and some universities for the simulator and navigation students.

Keywords

Navigation warning receiver simulator design and popular application.

1. Introduction

NAVTEX Short for Navigational Telex, literally translated as "navigation telex", which the transport ministry named "Naivoteus" in 1985.The system is a dedicated broadcast system for broadcasting navigation warnings, weather warnings, weather forecasts and other emergency information for ships sailing at sea, and is an integral part of the global navigation warning business.The global NAVTEX service and the security communication network service of the INMARSAT system jointly form the GMDSS maritime security information broadcasting system, which plays a very important role in ensuring navigation safety, improving navigation efficiency and other aspects. [1].It is understood that according to the IMO (International Maritime Organization) relevant convention requirements, ship pilots must attend the GMDSS special training, and pass the national maritime bureau examination to obtain its certificate of competency.However, due to the many types and high prices of real machines equipped with GMDSS system, it cannot be equipped with a large number of crew training institutions, and at present, many universities or social training institutions do not have such simulators or old simulator models.This type of aircraft and the current Marine equipment both from the function and interface, and cannot be operated with the Marine real aircraft operation.Because the signal will interfere with the normal use of ships on the sea surface, and limited by the electronic dongle of the simulator software, students can only conduct equipment experiments in a fixed laboratory, and can not practice freely after class.The above mentioned situations greatly reduce the significance of professional crew training, and students majoring in

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navigation still need to relearn the use of new equipment after boarding the ship, which also shows that to some extent, the current society and some universities cannot meet the overall needs of the current navigation students' knowledge update.And our design is to change this solidified training method. In order to save the cost of training and avoid the adverse effects on other ships, it is necessary to train the crew with NAVTEX receiver simulation equipment.This kind of simulator is based on web design, with the dual-end entrance mode of students and teachers, which realizes the purpose of teaching practice at the same time. It is not only convenient and fast, but also more realistic and feasible to simulate all kinds of situations during sea navigation, and also breaks through various limitations such as time and space， Truly achieve many times and without restriction. This has established a solid foundation for the implementation of navigation students 'teaching activities, and provided a good education and teaching environment for students' daily learning and training.

2. Problems with the popularity of navigation warning receiver simulator

Since China opened the international navigation warning meteorological information and emergency information business for international business, most of the ships are imported navigation warning receivers, which are used to enter the fault peak in succession. Due to the expensive repair cost, most ship owners adopt the update mode.In addition, considering that the relevant departments are formulating "standards for broadcasting Chinese navigation warning, meteorological information and emergency information system", once the Chinese navigation warning, meteorological information and emergency information business are opened in China, more ships will be equipped with receivers.At present, the model of the teaching equipment equipped by some social crew training institutions is different from the equipment model simulated by the simulator, which makes the real machine equipment and the simulation equipment separate from each other,The simulation equipment loses its use significance and practical value, and cannot be used in the process of teaching and training, which directly affects the teaching effect.The simulator still needs to be completed gradually, and should be updated with the development and progress of actual shipping industry, if the analog functions are imperfect or incomplete; the equipment time cannot be set or corrected; the three ships cannot be input or unchanged after input.At the same time, the GMDSS system knowledge about NAVTEX and other professional courses less, is a relatively independent module, it also led to the students have lack of perceptual knowledge and experience of maritime communication, communication professional English level because of the lack of relevant professional knowledge and to improve, the lack of understanding of maritime communication these characteristics.[2]

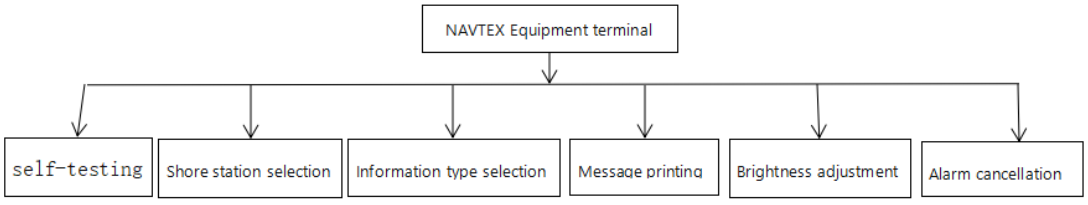

Figure 1 NAVTEX Functional framework

3. NAVTEX Composition, working principle and function of the receiver

NAVTEX System is through the NAVTEX shore using narrowband direct print telegraph technology CFEC way to broadcast information, by the ship NAVTEX receiver automatically receives the safety information of the sea to achieve information transmission. It is composed

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of three parts: information provision and coordination department, NAVTEX transmitting pad and NAVTEX receiver. NAVTEX The receiver automatically receives, selects, stores and prints the information broadcast by the transmitter station. As an indispensable part of the NAVTEX system, it is mainly composed of the antenna, the receiving unit, the information processing unit and the printer, as shown in Figure 2.

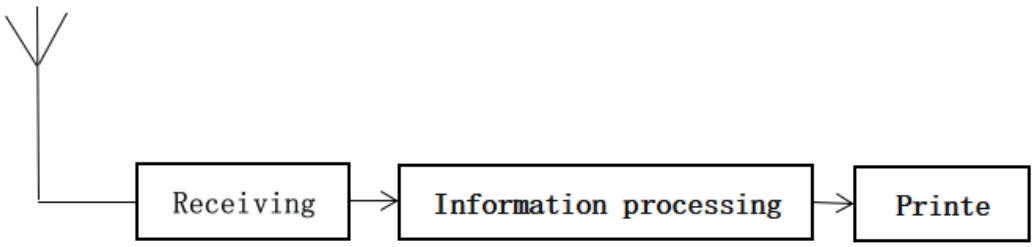

Figure 2 NAVTEX receiver composition

When working, the antenna first senses the corresponding signal and enlarges it, and is sent to the receiving unit for frequency selection, amplification and demodulation processing, so as to obtain the FSK signal with central frequency 1,700Hz and frequency shift ± 85Hz. Finally, the FSK signal is sent to the information processing unit, and restored to 4B / 3Y code to complete the inspection and error correction function and realize information receiving. The main function of NAVTEX receiver is to automatically receive, select and print maritime safety information (MSI) in A1 and A2 sea areas. The information processing unit in NAVTEX receiver has self-detection function for each component of the whole machine, and the printer can print the autodetection results.

4. Idealized future prospects for navigation warning receiver simulator design

Simulator operation panel is currently limited to the plane graphic, using the mouse in the computer operation, the sense of reality is not strong. Therefore, it is necessary to constantly improve the breakthrough in the hardware, using the real case and keys, and the inner movement core is replaced by software. The function of the software is to make the external equipment (display screen, antenna, buzzer, printer) show the real machine effect. Secondly, the functions of each part of the equipment should be reflected as software as complete as possible. The common equipment model currently used on the ship should be considered in the software upgrade. Ideally, it is best to encourage cooperation with the ship company to participate in the research and development of the simulator. Since the simulator mainly relies on computer technology, the ship company or the ship can assemble a set of stand-alone version of the training software, and the cost is not large. The crew can practice at any time during the rest or spare time, and the pilot who does not understand can also be explained and taught by the certified personnel, so as to achieve twice the result with half the effort, so that the ship personnel can use GMDSS equipment like a mobile phone, so as to truly guarantee the navigation safety of the ship.[4,5]

5. Discussion and innovation

The survey found that compared with traditional teaching methods, teaching with GMDSS simulator can enable trainees to better master Marine skills, including being more skilled in fully tuning the selected frequency before using NAVTEX, doing daily testing and inspection of radio stations, and improving trainee satisfaction. Therefore, the use of adding a simulator in the teaching is a practical way to strengthen the effect of training. This study also has some

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limitations, and the original simulator has certain geographical limitations. Given the current LAN limitations of the original simulator, the next step will be to optimize the wide range of the simulator training course to bring more benefits to the trainees as much as possible. In short, in the GMDSS simulator teaching training, combined with the GMDSS simulator training compared with traditional training, for students daily learning training provides a good education teaching environment, the implementation of the teaching activities for students to establish a solid foundation technology and improve students satisfaction, worth application, our simulator will conform to the era development, according to the new situation development follow up, constantly explore in the positive enterprising, for the great cause of Marine power offer a strength.[3]

6. Tag

This paper studies the popularization and application of navigation warning receiver simulator in navigation universities. It proves the advantages of navigation warning receiver simulator in navigation universities. It can not only meet the requirements of students majoring in navigation for good mastery of navigation communication equipment, but also simulate and change the corresponding environment according to personal requirements. It also can achieve the role of assessment and monitoring based on the two-end entrance of teachers and students' education. However, given the application of the navigation warning receiver simulator in the navigation field, and the development, operation and writing of the simulator are among the current frontier research fields. Therefore, this paper only discusses the popularization and application of navigation warning receiver simulator in navigation universities. In the future, the navigation warning receiver simulator will continue to improve and update, improve and improve and develop with the progress of China's shipping industry and the improvement of the demand for training and teaching purposes of navigation universities.

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Reference documentation

[1] Virtual NAVTEX Simulation teaching system [J]. Han Yundong, Zhong Yunhai, LAN Guohui, Wang Su, Ma Hairui . Dalian Naval Academy. 2019.

[2] Problems and countermeasures of GMDSS simulator in the teaching process [J]. Huang Liqing. Journal of Jimei University (Education Science Edition). 2014(03).

[3] Scenario and practical training of GMDSS training for driving professional students [J]. Wang Zhichang. vocational technology. 2009(06) [4] Outlook on the development trend of GMDSS system under the electronic navigation strategy [J]. Wang Jing. lyceum. 2017(06) .

[4] Application of GMDSS simulator in navigation teaching [J]. Chen Junhua. Journal of Zhejiang Communications Vocational and Technical College. 2006(S1).

[5] Application of navigation simulator in navigation education and training in China [J]. Jie Junwu, Li Donglou, Miao Congjin. Chinese water transport (in the second half of the month). 2017(08).