

The International Maritime Transport and Logistics Conference  
"Marlog 10"

**Digitalization**  
in Ports & Maritime Industry



DR Karim Aboul-Dahab

National Telecom Regulatory Authority (NTRA)



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## INTRODUCTION



The technological change in the maritime industry may render workers' skills obsolete, automation has been gradually replacing employees in many industries , for instance to move from first degree (MASS) to second degree (MASS) means that a less number of seafarers are required on board and a new technical competencies deems necessary to proceed to the next phase of the shipping automation.

The progress towards digitalization and computerization is accelerating in the shipping industry, digitalization activities has influenced various business activities within the marine industry, This will create significant new demand for a range of occupations, including; **Ship Automation Specialist, Cyber Security Specialist and Data Protection Specialist.**





## INTRODUCTION

SHIP **AUTONOMY LEVELS** ARE CATEGORIZED ON A SCALE

0

### CONVENTIONAL SHIP

- Fully manned ship
- Humans acquire and analyze data, make and execute decisions

1

### SMART SHIP

- Directed by humans
- Rely on systems and sensors for support in collecting data and making decisions

2

### SEMI-AUTONOMOUS SHIP

- Human delegated or supervised
- Rely on systems to make decisions and/or initiate actions

3

4

### FULLY AUTONOMOUS SHIP

- Unmanned ship
- Requires no input from humans other than in an emergency





## BACKGROUND

The current version of STCW 1978 (as amended) has 19 competence themes consisting of 66 Knowledge, Understanding & Proficiency items (KUPs), which specifies the minimum standard of competence for officers in charge of a navigational watch on ships of 500 gross tonnage or more. The curriculums in maritime education and training (MET) university education must react and adjust to the upcoming changes within the maritime industry which demand raising the awareness among all industry stakeholders on the essential Competencies for Autonomous Maritime Operation.

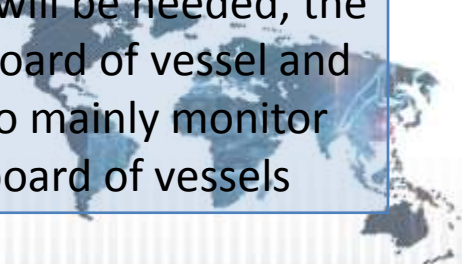




BACKGROUND



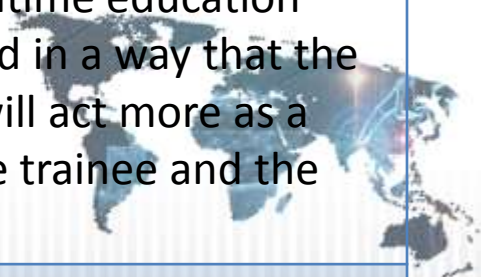
Authors	Suggestions
Pan, Yushan, et al , 2019, Ekow Manuel, M., 2017	Maritime Education & Training system as the Vocational ,academic and Simulation-based s maritime education system should be modified to cope with the digital trends in the maritime industry
Komianos, A., 2018), (Aldauf, M, et al , 2018 )	Regulatory ,insurance, juridical, safety and the seafarer readiness are among the key challenges toward the autonomous vessel implementation
Bauk, S. and Alop, A., (2020)	two types of seafarers will be needed, the traditional master on board of vessel and the other seafarers who mainly monitor the smart systems on board of vessels



BACKGROUND



<b>Authors</b>	<b>Suggestions</b>
(Erdogan, O. and Demirel, E., 2017)	suggested that to improve the quality of maritime education and training (MET) in turkey , maritime universities needs to implement a holistic education and training programmers that meets both vocational and academic requirements, moreover the seafarer needs now more than ever to effectively integrate ICT in their curriculums
Pan, Yushan, et al , 2019	simulator –based maritime education should be reconfigured in a way that the education providers will act more as a mediator between the trainee and the technology



## Issues, Controversies, Problems



Maritime capacity building aims to address gaps between the status quo and future requirements for competency development.

Although digital technologies are creating major new opportunities and jobs in the maritime industry , they also increase the demand for digital skills and competencies.

Maritime Industry 4.0 require more computer knowledge to get acquainted with the advances in maritime technology onshore and offshore





## Issues, Controversies, Problems



In order to identify the main knowledge and skills needed for the future operation of autonomous vessels, (Wang Deling, et al ,2020) have already divided the knowledge and skills needed by navigators in the future to manage and operate MASS into three aspects: Ability, Knowledge and Technology as illustrated in the next slide.

Accordingly (Wang Deling, et al ,2020) in higher levels of MASS, the seafarers will not be classified according to the work environments and transport control , in this respect seafarers will be classified in to two categories : "shore-based" staff and "shipboard group". The shore-based team will be responsible for distant operations of the vessels, such as the ship navigation via a remote control center , while the offshore team will be responsible for numerous tasks such as navigation and machine maintenance.





The main competences to operate degree one Autonomous ships

Competencies	Top Manager (Ship Owner )	Middle Manager (Fleet Manager )	Lower Level ( Ship Master ,Chief Engineer )
Leadership and communication	✓	✓	✓
Technical		✓	✓
Automatic Control Knowledge		✓	
Data Mining Knowledge		✓	✓



The main competences to operate degree two Autonomous ships

Competencies	Top Manager (Ship Owner )	Middle Manager (Fleet Manager )	Lower Level ( Ship Master ,Chief Engineer )
Automatic Control Knowledge		✓	✓
Critical thinking	✓	✓	✓
Internet of Things IOT	✓	✓	✓
Automatic Control Knowledge		✓	✓



## CONCLUSION



- The development of MASS needs more skilled maritime talents, so the proportion of maritime talents at the levels of technical secondary will continue to shrink, and those of high-vocational and undergraduate level will occupy the mainstream.
- `
- Maritime industry is undergoing radical changes with the technological advancement and fast introduction of automation technologies. To cope with increasing industrial demand and accelerated technological development, the global standard of maritime training and certification will also require revision and adaption.
- Maritime universities, colleges, training institutions and maritime authorities are suggested to closely track the development of MASS and provide relative new knowledge and improve modes of maritime education in order to produce talents suitable for the development of navigation technology.



