



Vessel communication requirements,
looking forward to reduced and zero crew

Autonomous ships have become a popular objective in our industry



But these are not “Autonomous” ships

**“We’ve seen the last of
Autonomous Ships”**


Mike McNally

Global Commercial Director, GTMaritime

Personal Opinion

autonomous adjective



au·ton·o·mous | \ ó-'tä-nə-məs  \

Definition of *autonomous*

- 1 **a** : having the right or power of self-government
// an autonomous territory
- b** : undertaken or carried on without outside control : SELF-CONTAINED
// an autonomous school system
- 2 **a** : existing or capable of existing independently
// an autonomous zoid
- b** : responding, reacting, or developing independently of the whole
// an autonomous growth

Now this was an autonomous ship...

- The Master was the local deity
- If assistance was needed it came from on board
- “Autonomy” of ships has declined since radio
- Innovations in communications and automation technology have reduced crew.
- More shoreside involvement in support and decision making



Indisputable: Automation of ship operations will continue to increase

THE TREND OVER THE PAST 60 YEARS

Looking at US Flag – Average oceangoing crew size

1960 – 41 crew

1980 – 24 crew, due to automation

2000 – 21 crew

2020 – 16 to 19 crew*

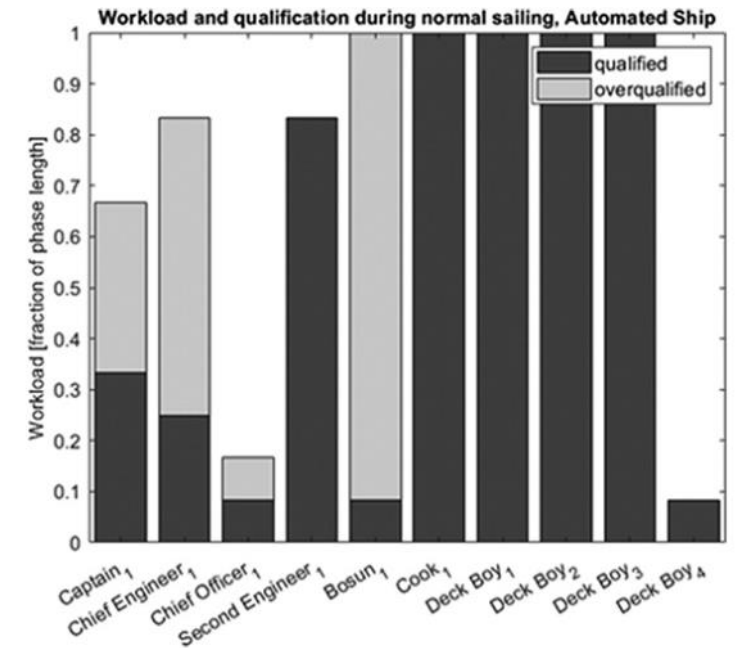
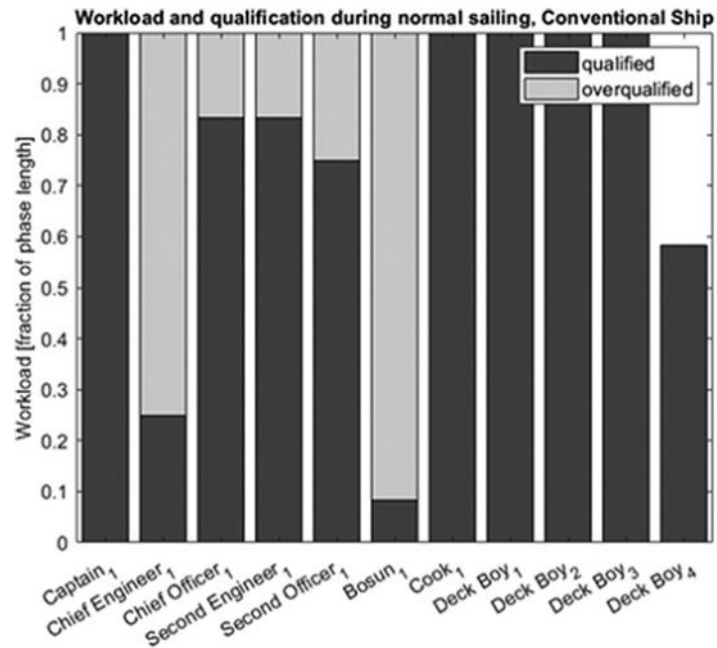
*if regulation allows

HOW MUCH MORE CAN BE ACHIEVED

- Average crew size is not the goal
- Segmented high automation will reduce crew numbers further
- Fully autonomous ships target zero crew at sea

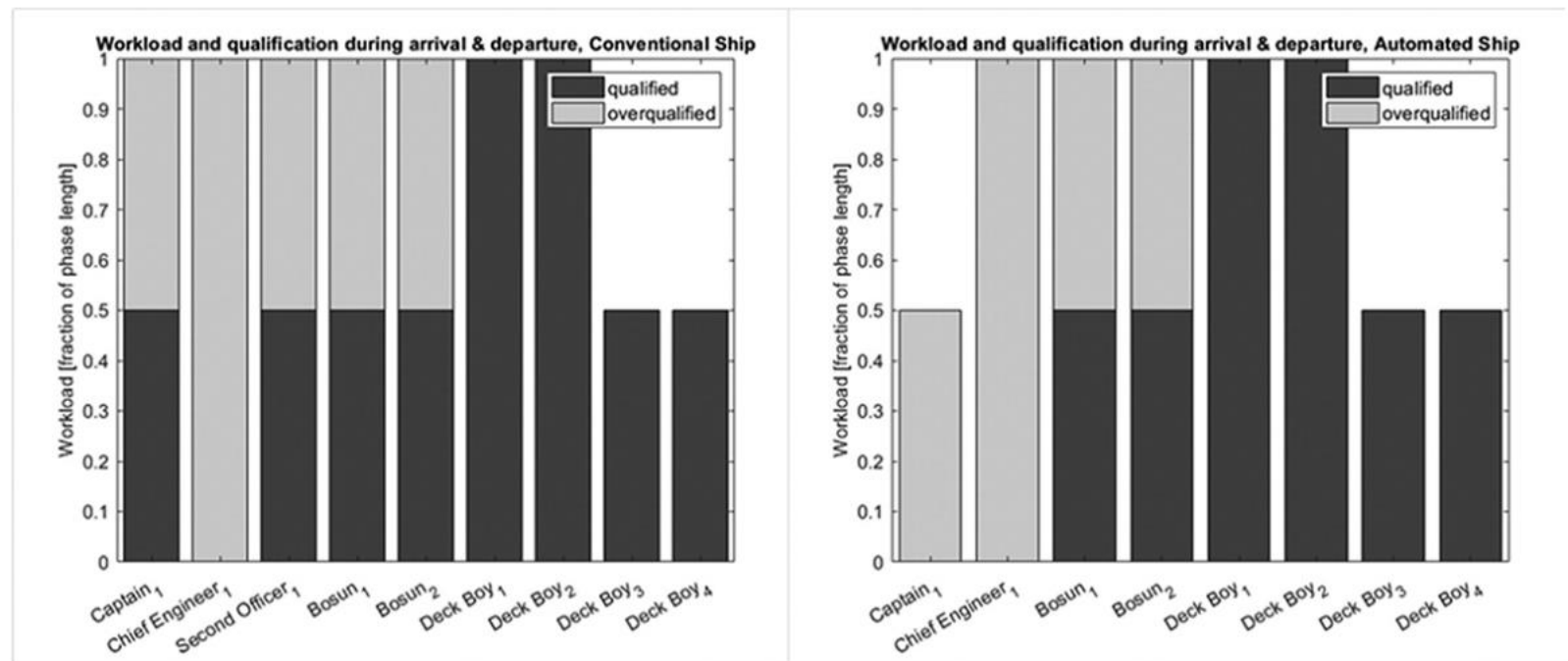
Normal Sailing - Until a ship is operated fully autonomous this study suggests the further crew reduction is restricted by the various tasks and the schedule requirements of a real crew. Reducing from 11 persons to 10 persons in this scenario.

The effect of autonomous systems on crew size



Arrival & Departure - Here the comparison is between automation while maintaining traditional task assignments(left) and ignoring the traditional assignments reducing from 9 persons to 8 in this scenario, eliminating the 2nd Officer.

The effect of autonomous systems on crew size



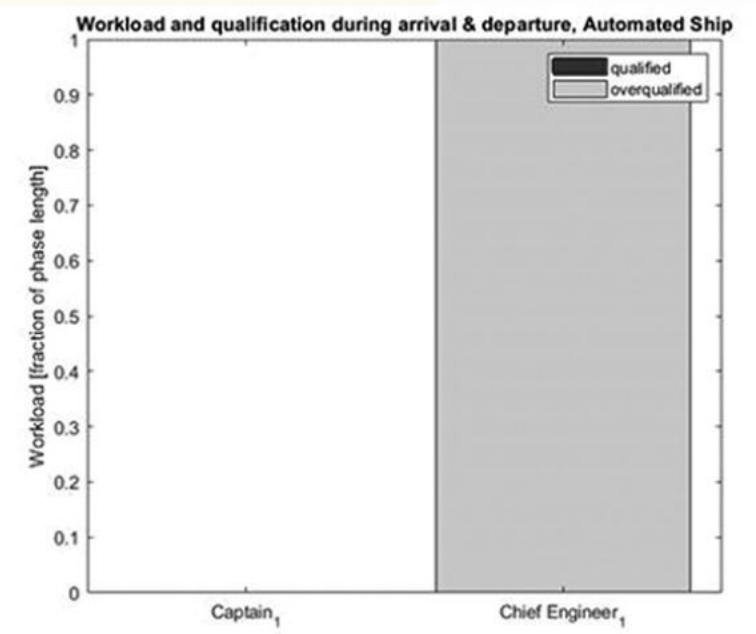
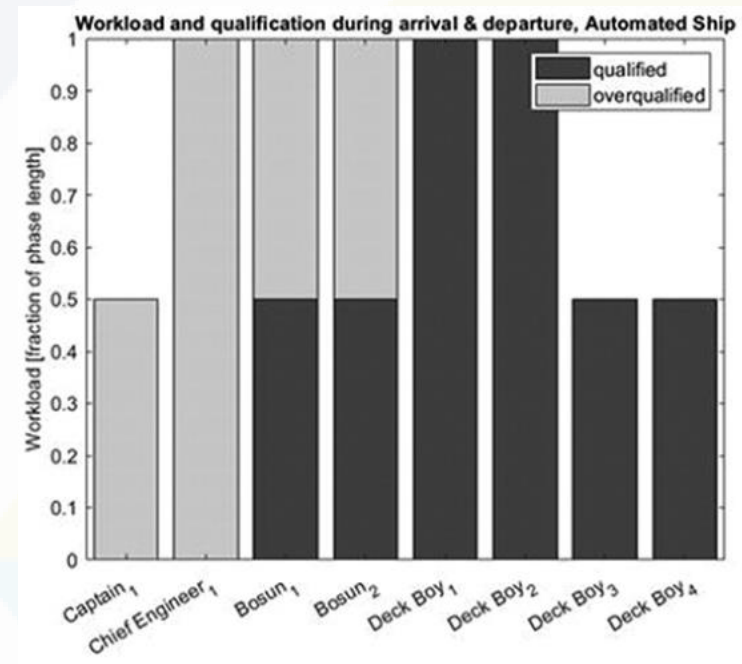
Carmen Kooij & Robert Hekkenberg (2021)

The effect of autonomous systems on the crew size of ships – a case study, *Maritime Policy & Management*, 48:6, 860-876,

DOI: 10.1080/03088839.2020.1805645

Arrival & Departure - Decrease in the required number of crew members between a ship with automated navigation tasks (left) and a ship with automated navigation and mooring tasks

The effect of autonomous systems on crew size



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Communications: The reduced crew will require more tightly integrated support from shore and more efficient and secure administrative systems

INTEGRATED REMOTE SUPPORT

- Navigation command oversight
- Weather routing and speed for arrival decisions
- A/R task assistance
- Efficient & secure data transport to support remote analysis

EFFICIENT AND SECURE ADMIN SYSTEMS

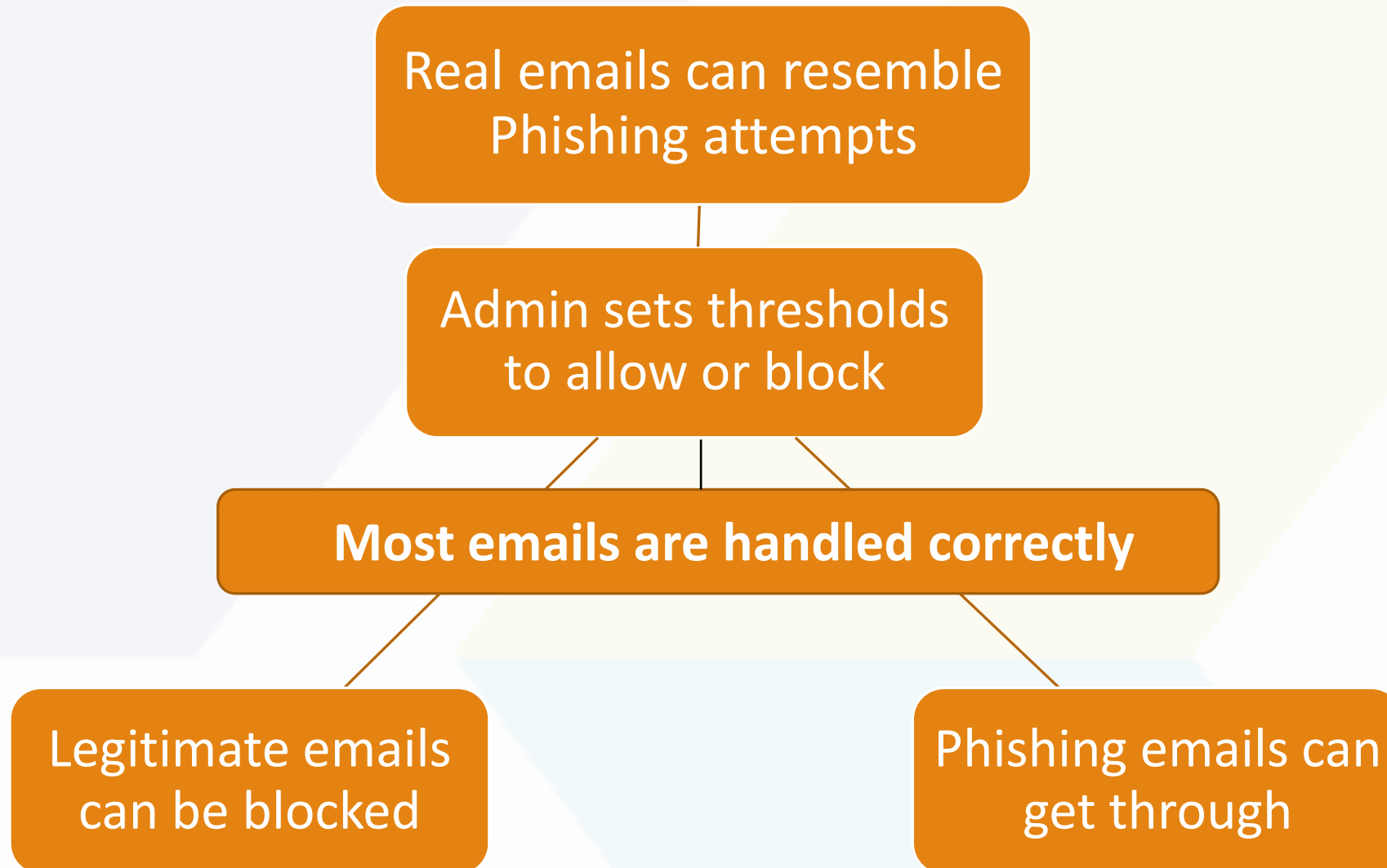
- Broader responsibilities will require more interactive support systems to avert errors
- Higher reliance on remote support increases cyber security vulnerability
- Communications methods need to be fully secure, reliable and auditable
- Shipboard software needs to be maintained on latest versions for security



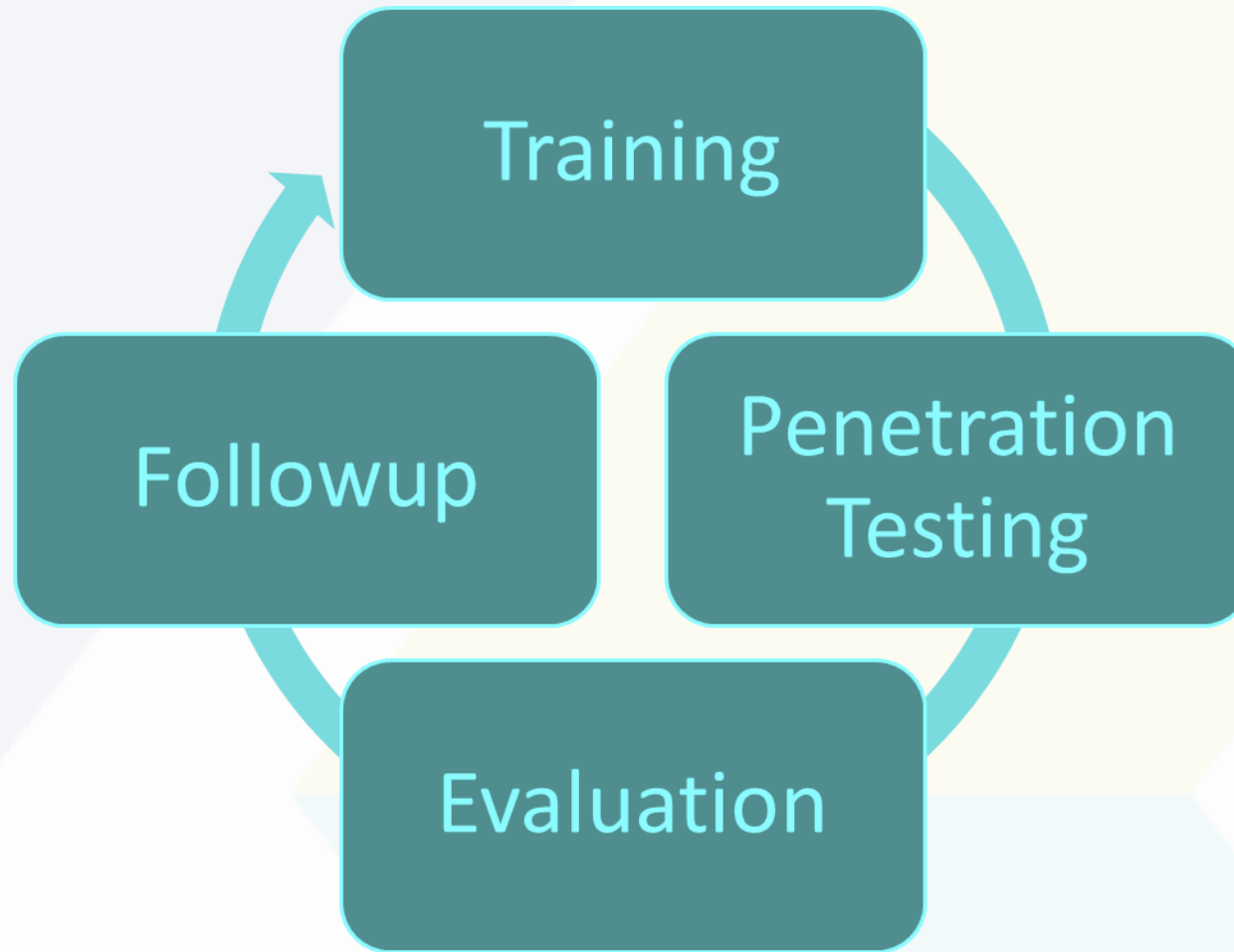
Whilst you can take all the steps to secure your vessels via software there is always one vulnerability....

people

Anti-Phishing software cannot stop 100%



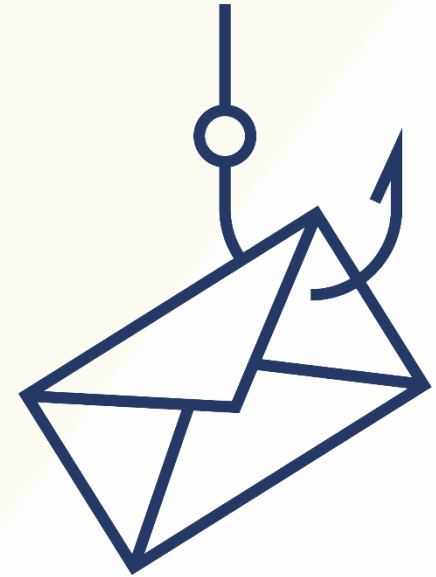
Office staff and crews must be vigilant!



GTMaritime Phishing Penetration Testing

What we do

- Option to send one of 3 phishing messages, using information readily available by public searching; i.e.
 - Port Authority – requesting vessel details via email
 - Port Authority – requesting crew details via a link
 - Mailbox Full – requesting login details
- The chosen message is distributed to vessels, bypassing the normal anti-phishing filters



GTMaritime Phishing Penetration Testing

What we discovered

- On avg. out of 1,000 vessels sent a phishing message
 - 124 respond with the requested information
 - Some provided all crew passport information
 - Others shared their user emails and passwords
- The results varied widely by fleet. Training pays off.
- In the worst case 50% of the ships in a fleet responded with the requested information.



How to run a phishing penetration test

- There has been a sharp increase in the numbers of customers asking email providers to allow a 3rd party to run phishing penetration tests
- Lowering security gauntlet to allow these poses a grave risk to customers
- This requires significant scrutiny of the supplier sending the test messages
- Your email/security provider is not able to test the messages without compromising the test results
- Make sure your vessels remain protected even when testing



GTMaritime have solutions to assist with areas of your full vessel requirements now and in the future,

if you want to find out more I'll be on our stand shortly.

Thank you for listening