



# **The Digital Ship –**

**setting the scene for the ship of tomorrow**

**Wondermar & ICCAS**

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**Carsten Melchiors**

**Maritime Development Center of Europe**

# MARITIME DEVELOPMENT CENTER OF EUROPE



[www.maritimecenter.org](http://www.maritimecenter.org)

# The Maritime Cluster



- Ship owners
- Shipyards
- Component manufacturers
- Port authorities
- Service companies
- Research institutions
- Educational institutions
- National authorities
- Trade organisations
- Finance and insurance



## European Union, Norway and Iceland

Total fleet of: 6,975 vessels

17% of global fleet in tonnage

Controlled fleet: 44% of world total



## European Union

External trade: 90%

Internal trade: 41%

is carried by sea by volume



## European Union

190,000 seafarers

2,000,000 employed in the maritime sector



## Danish merchant fleet

531 vessels

14,000 seafarers

45,000 employed in the maritime sector



## Danish merchant fleet

Currency earnings year 2001 € 14 billion

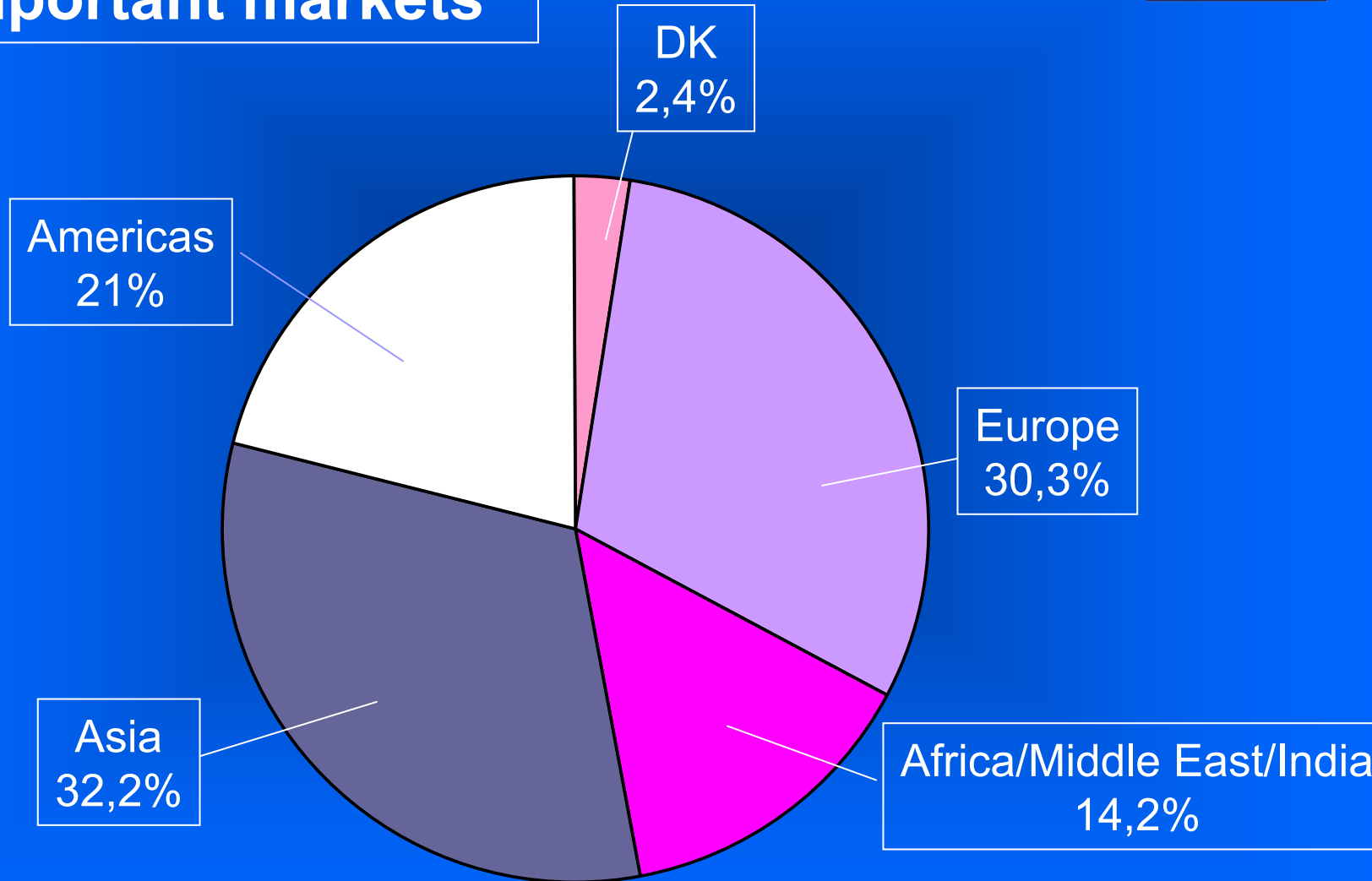
15% of total Danish currency earnings in year  
2001

Net contribution € 2,5 billion



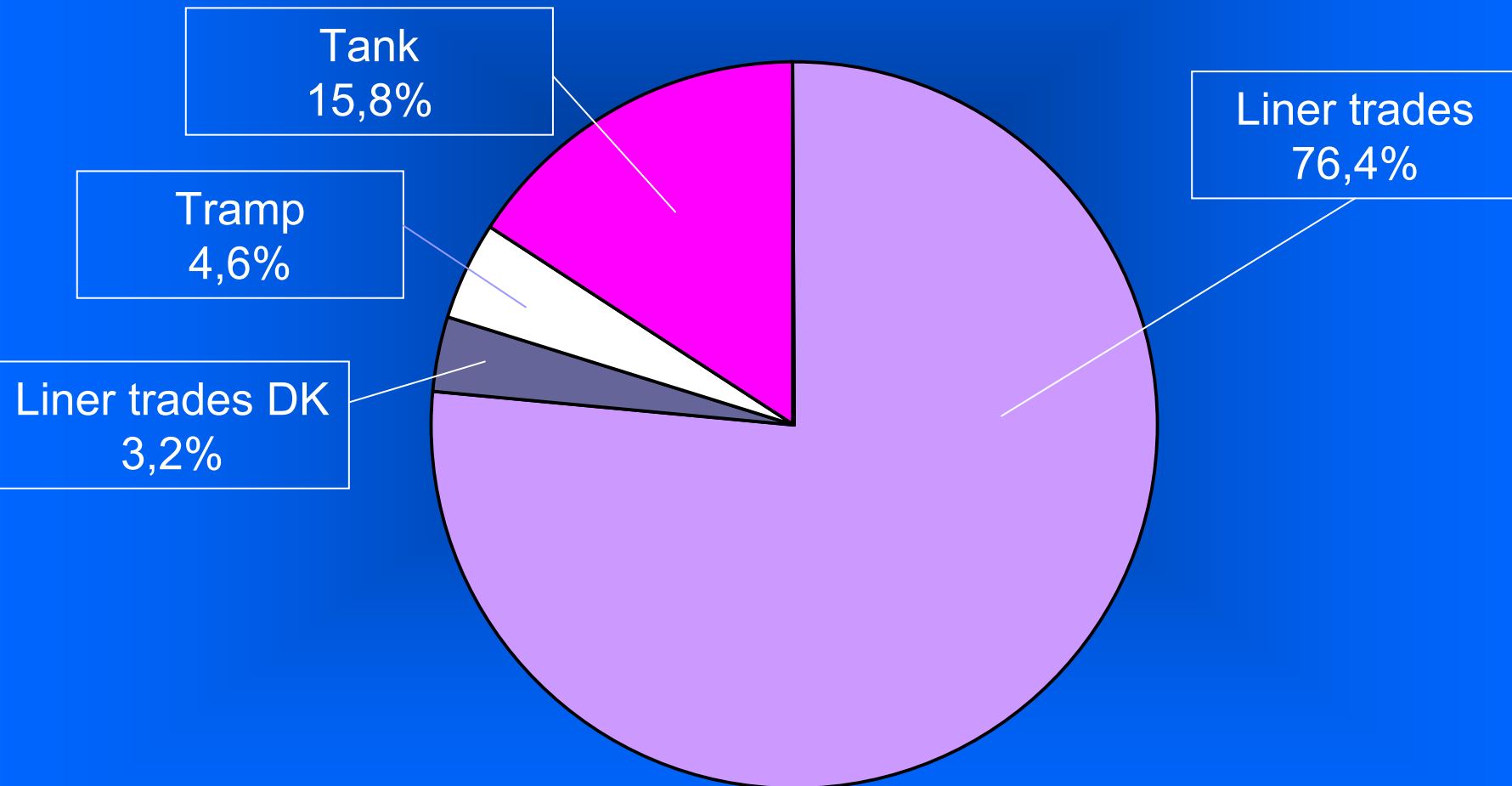
# Danish shipping

## Important markets

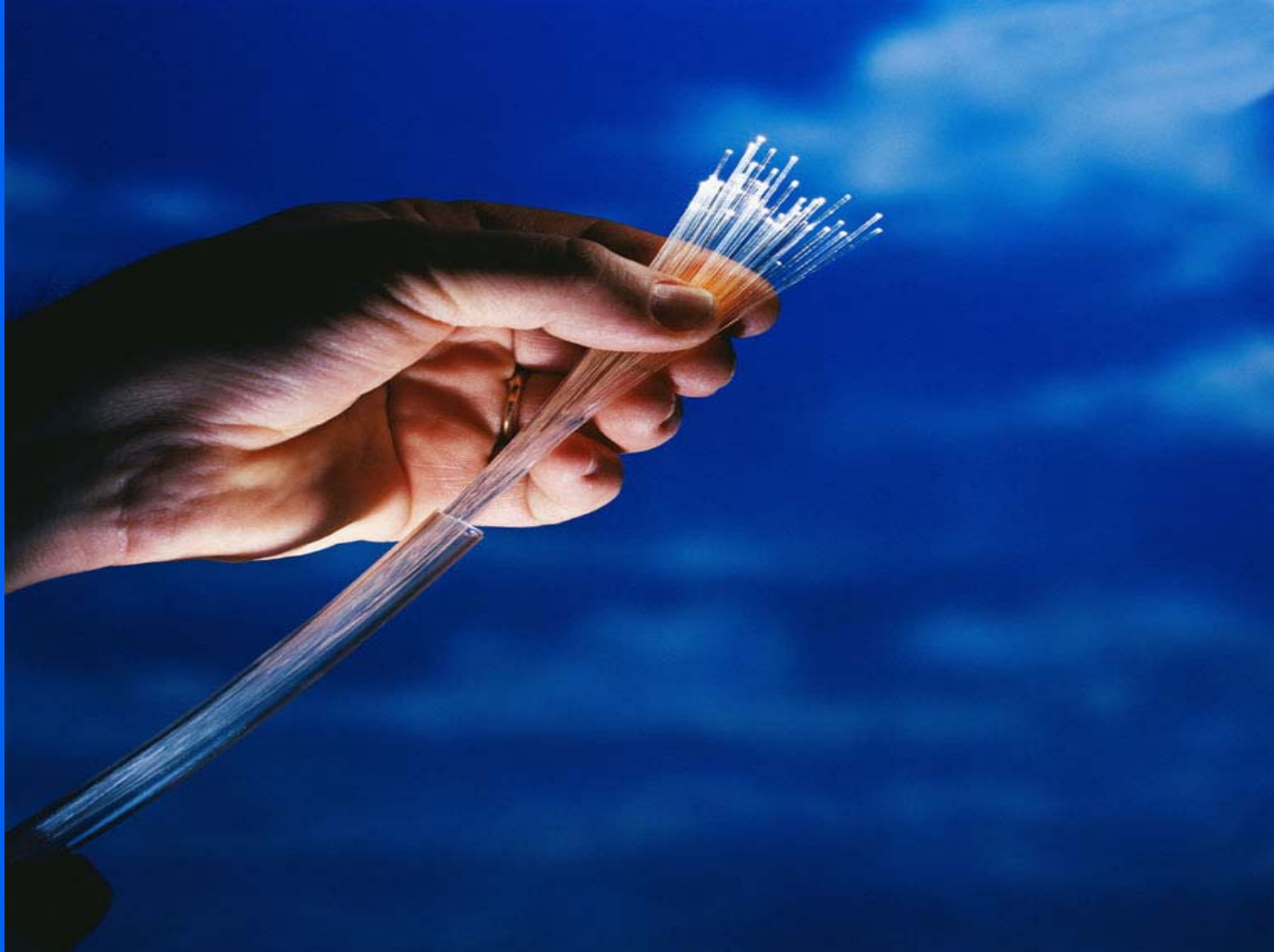


# Danish shipping

## Important trades, by gross freight



*BECAUSE THAT IS WHERE YOU AND I SHALL*



*WE ARE ALL INTERESTED IN THE FUTURE -*

*OF THE NEXT GENERATION OF CONCEPTS.*

**WE ARE ALL INTERESTED IN THE FUTURE –  
BECAUSE THAT IS WHERE YOU AND I  
SHALL SPEND THE REST OF OUR LIVES!**


# Factors of influence

## Internal:

## External:

### Alternation of Generations



- Safety
- Small crews
- Costs
- Technology and IT
- Operational stability
- New dual purpose officer
-  **flexible**
- New CBA's
- International crews

- Customers
- Stakeholders
- Public opinion
- Competitors
- Control
- International rules
- Safety & Security
- Sustainability

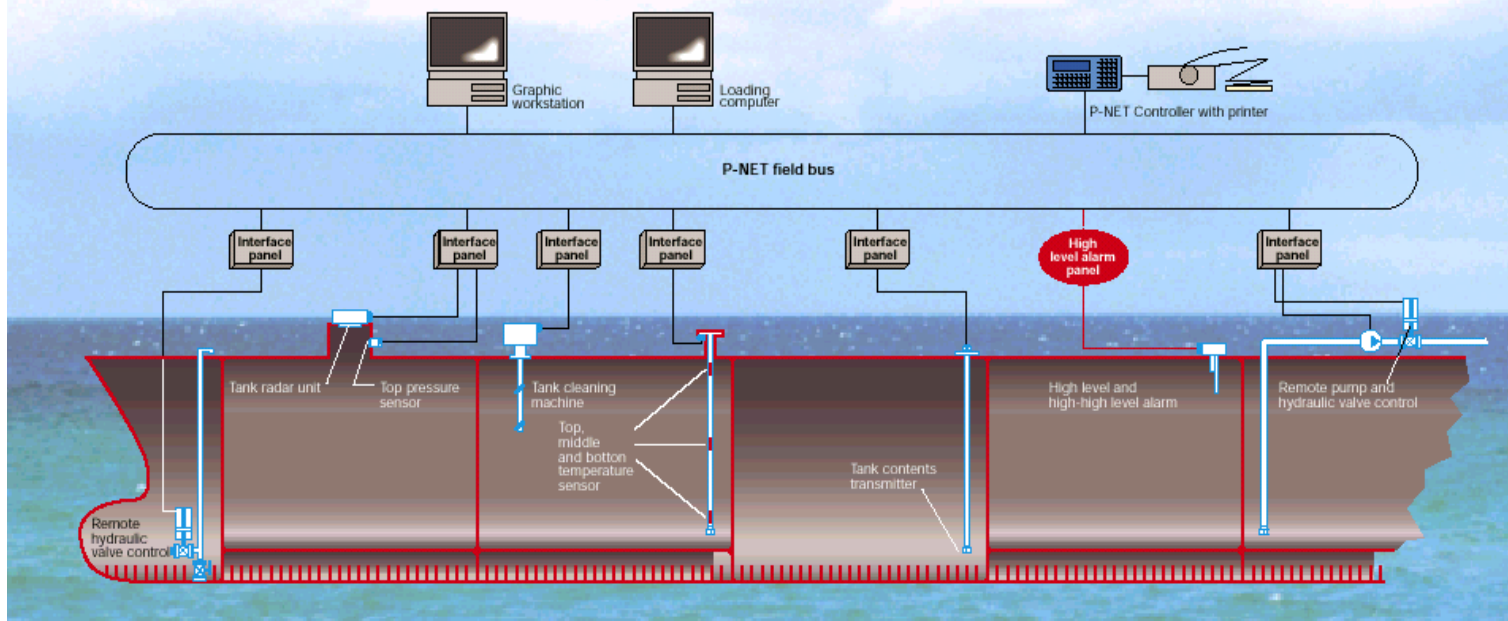
## The “new function” of the officer:

- Safe operation and navigation
- Risk analysis and safety evaluation
- Responsibility for ships maintenance budget
- Monitoring, hull, components & cargo

# Marine Tank Management



## MTM system layout example



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SHARE OF END THE REST OF OUR LIVES.

## The “new function” of the officer:

- Safe operation and navigation
- Risk analysis and safety evaluation
- Responsibility for ships maintenance budget
- Monitoring, hull, components & cargo
- Planned maintenance
- Diagnosis and “alarm” response
- Reporting (requirement for documentation)
- Continuous Survey “on-line”

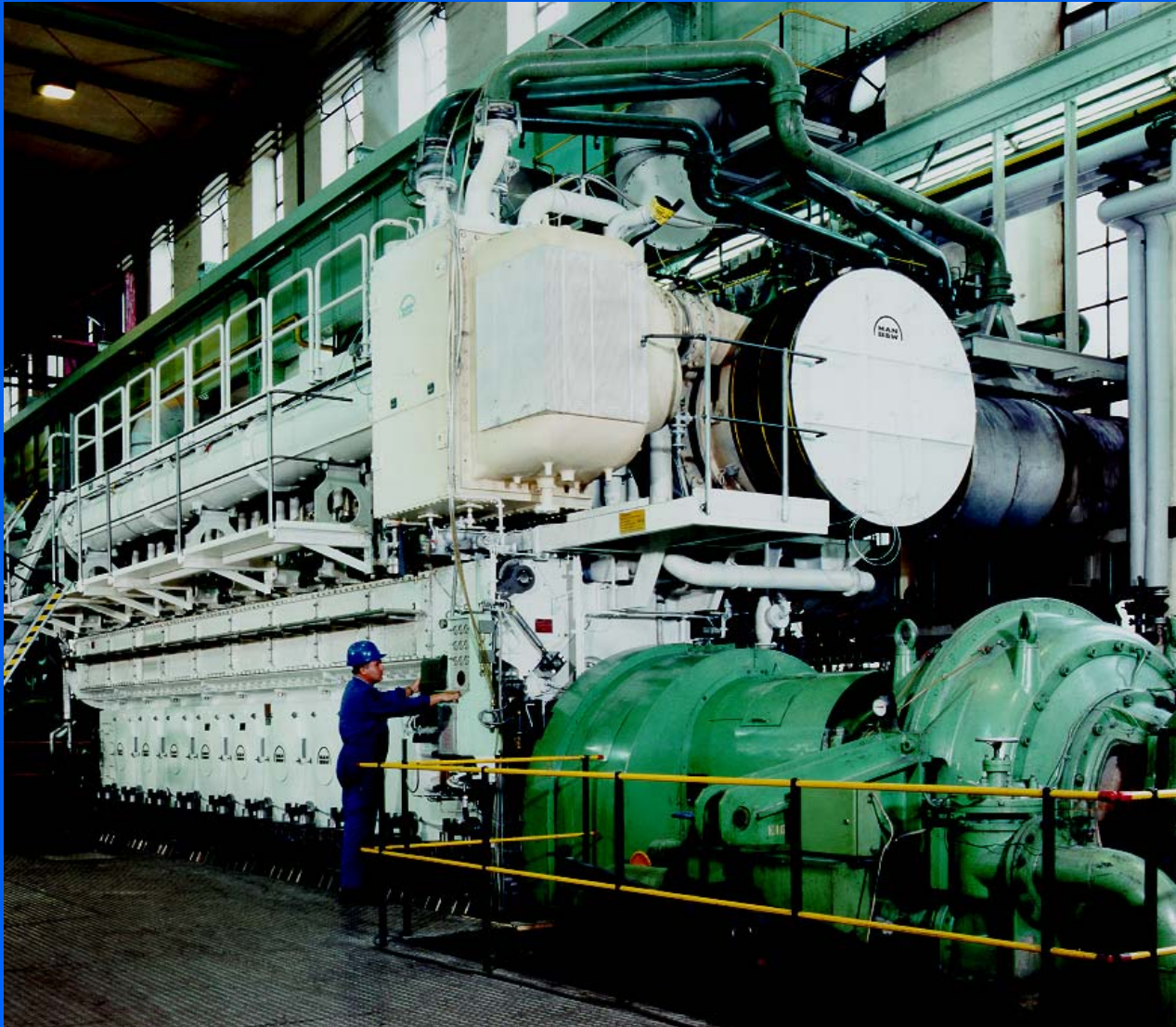


## The “new function” of the officer:

This will be enabled by:

- Digital description of components

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## The “new function” of the officer:

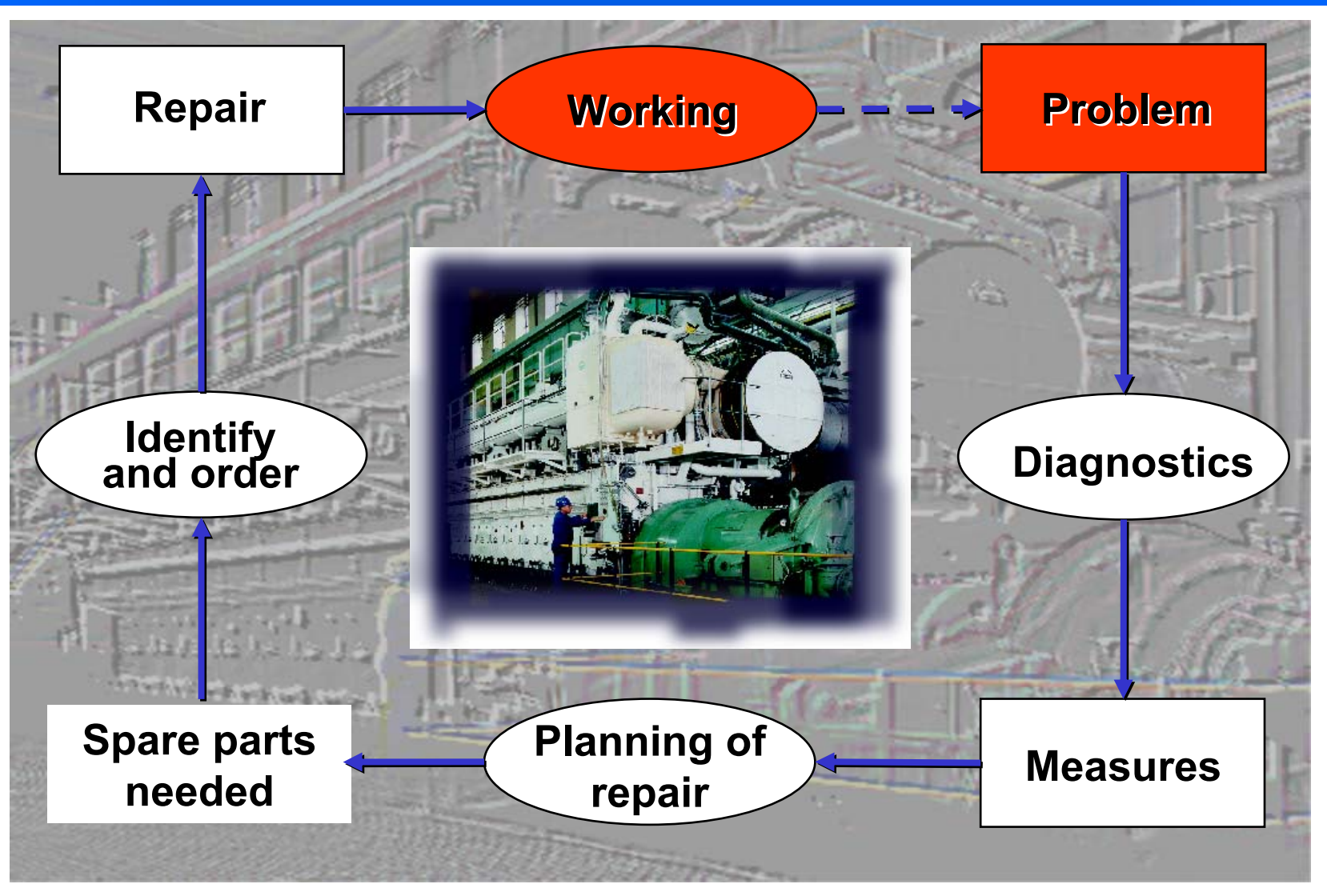
### This will be enabled by:

- Digital description of components
- Planned maintenance system for components
- Spare part stock holding system
- Purchasing system with accounting module
- Electronic documentation, documents & administrative, PC based systems
- Integrated ship control (ISC)
- Cheap, global satellite communication and Internet access
- Internet based procurement facility
- Internet based e.learning facility

## “New” requirements for components:

- Automation
- Remote observation of condition, on-line data logging, monitoring trends
- Inter-phase between machinery and systems, connectivity & problem solving

# Connectivity & problem solving



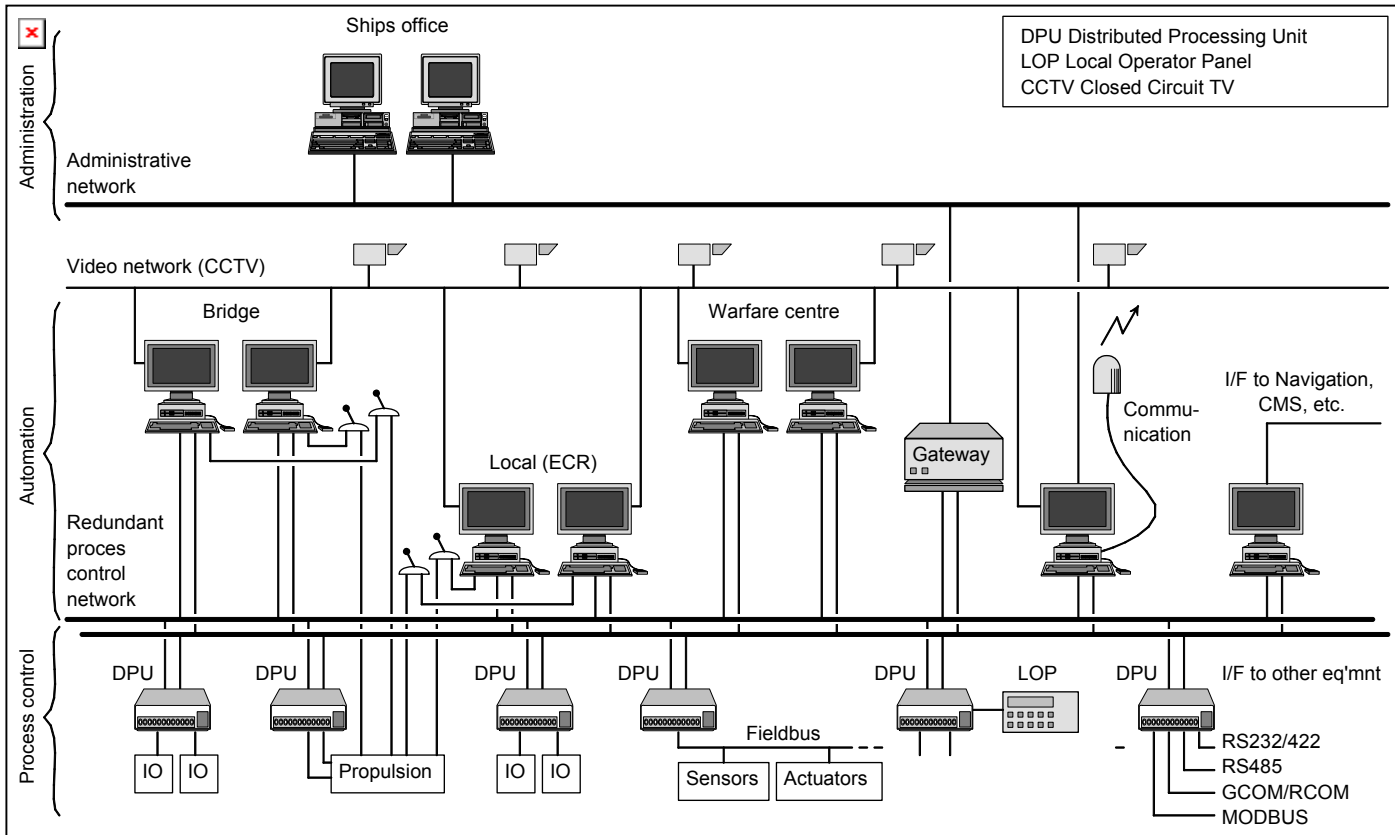
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## “New” requirements for components:

- Automation
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- Vessel equipped with single data network

# One Network



*Typical network architecture for Integrated Platform Management Systems.*

## “New” requirements for components:

- Automation
- Remote observation of condition, on-line data logging, monitoring trends
- Inter-phase between machinery and systems, connectivity & problem solving
- Vessel equipped with single data network
- Single display/new vessel control center
- Uniform user display – application swapping
- Error detection – remote error diagnosis – Telemetry – Fleet 77
- Redundancy



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## “New” requirements for components:

- Built in “test” mechanism – intelligent sensor
- Modular configuration of equipment
- “Plug and play”
- The role of the “integrator”



# WORLD CLASS — through people, technology and dedication



A network of ideas



Technology — inspired by nature



Kongsberg — at your command

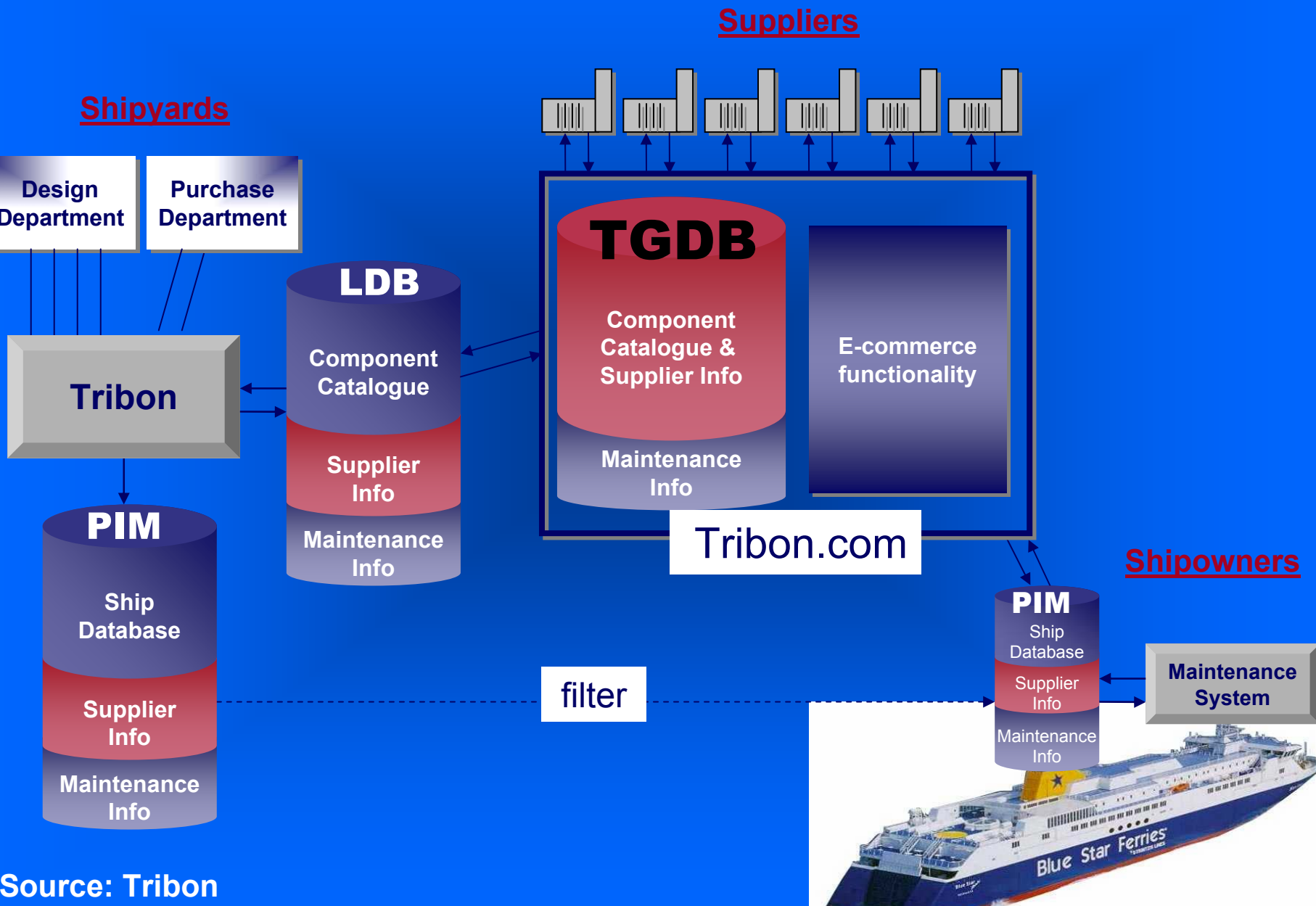
## “New” requirements for components:

- Built in “test” mechanism – intelligent sensor
- Modular configuration of equipment
- “Plug and play”
- The role of the “integrator”
- Upgrade retrofit possibilities – also for systems through operational life
- Man-Machine Inter-phase, smart & simple: “intelligent interior – simple handling”
- Digital 3-D display of components and maintenance instructions
- Global servicing facilities

## What we want from the builder!

- Integration of ship construction, and operation incl. retrofit in the design phase
- Integrate decommissioning (scrapping/recycling) in the design phase – life cycle design
- Integrate the virtual ship design with operating and maintenance procedures
- Digital ship follow the physical ship

# Digital ship follow the physical ship





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