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Sverre Gotaas

Vice President Technology

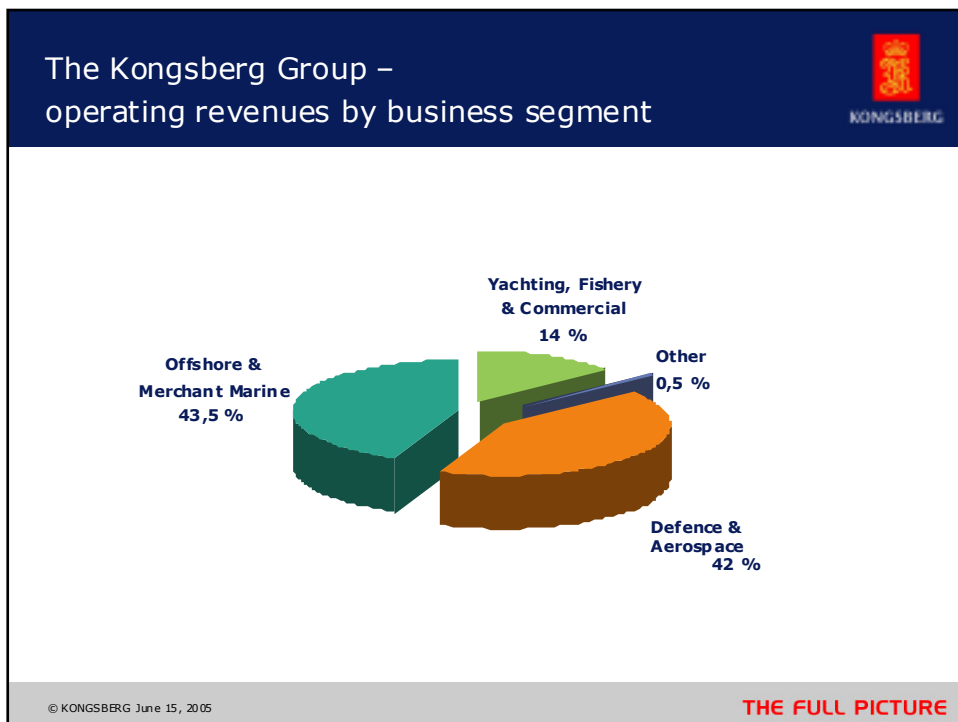
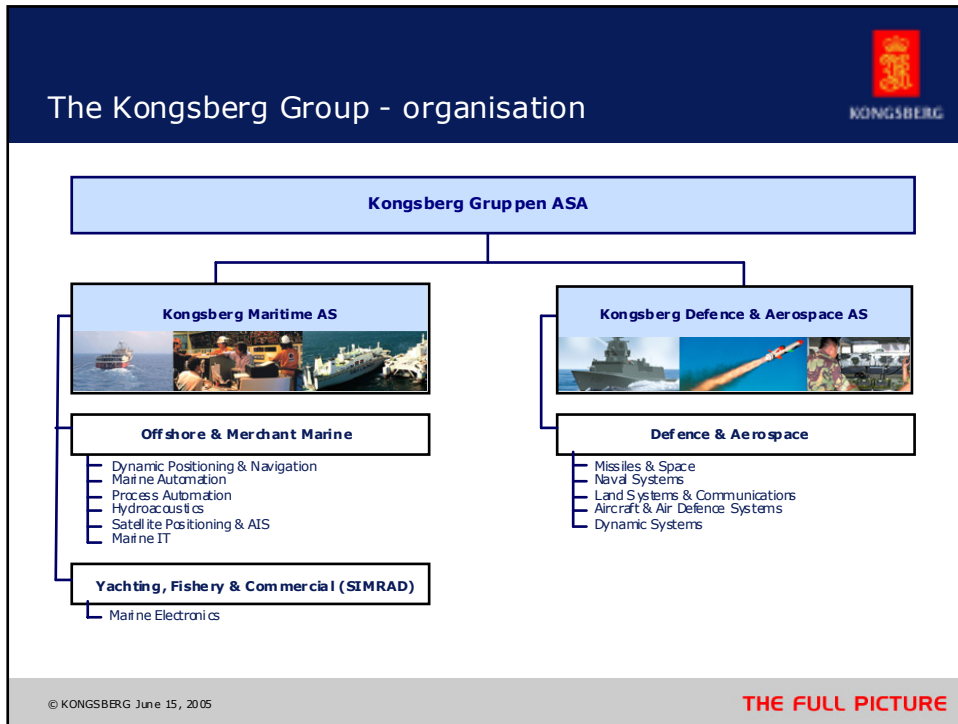
WORLD CLASS – through people, technology and dedication

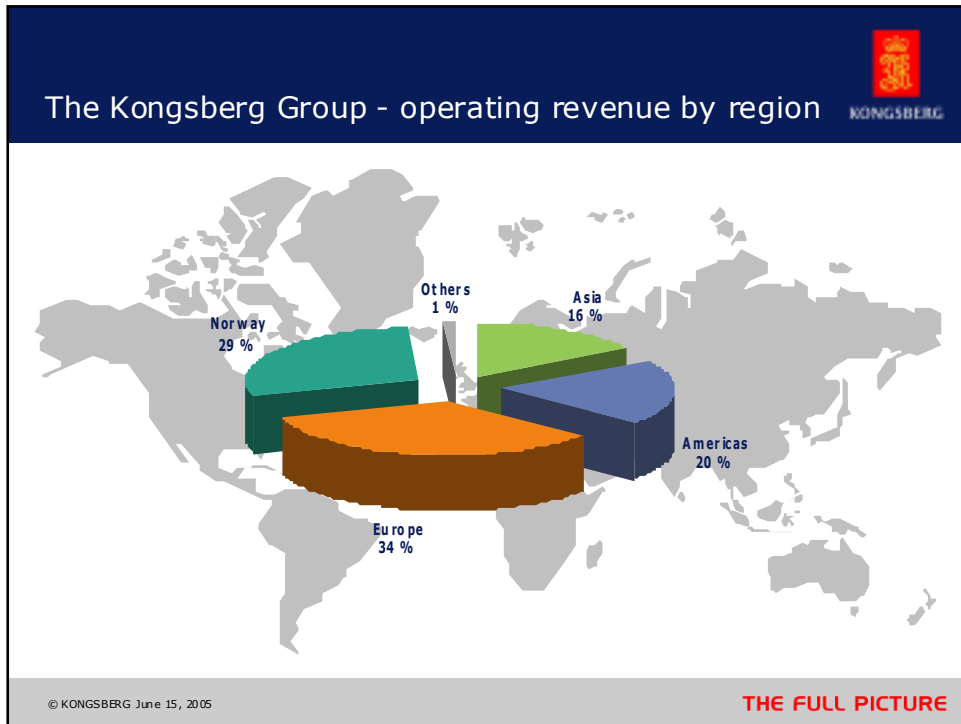


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We maximize marine performance by providing

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Merchant marine



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- Automation
- Cargo monitoring and control
- Navigation
- Dynamic positioning
- Sensors and transmitters



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Offshore



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- Dynamic positioning
- Vessel control
- Thruster control
- Safety systems
- Process automation
- Process simulation
- Vessel reference systems
- Satellite reference systems
- Vessel tracking systems



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Subsea



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- Sonars
- Telemetry
- Positioning
- Echo sounders
- Cameras and lights
- Autonomous
- Underwater vehicles



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Marine IT



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- Ship simulators
- Electronic logbooks
- AIS infrastructure
- Maritime surveillance
- Vessel traffic and information management



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SIMRAD



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- Communication
- Navigation
- Automatic steering
- Radars
- Sonars
- Fish finding
- Trawl instrumentation
- Fishery research



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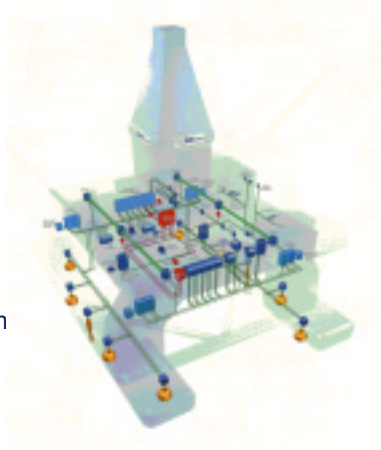
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Integrated Control System



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- Integration of vessel control functions
 - Dynamic positioning
 - Manoeuvring - propulsion & thruster control
 - Navigation
 - Vessel automation
 - Alarm and monitoring system
 - Power management and engine room auxiliaries control
 - Ballast and cargo control
 - Safety systems
 - Data logging, trending, reporting
- Common hardware and software platform
- System wide information flow
- A single supplier



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What are the problems concerning reliable and safe systems?



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- Technically – a matter of communication, integration and system development
- Operationally – a matter of how to use the equipment to reach a specified goal
- Organizationally – who is going to use the systems – and from where
- Contractually – who is responsible for the functionality, how to get paid for taking this responsibility – and what means may be used?

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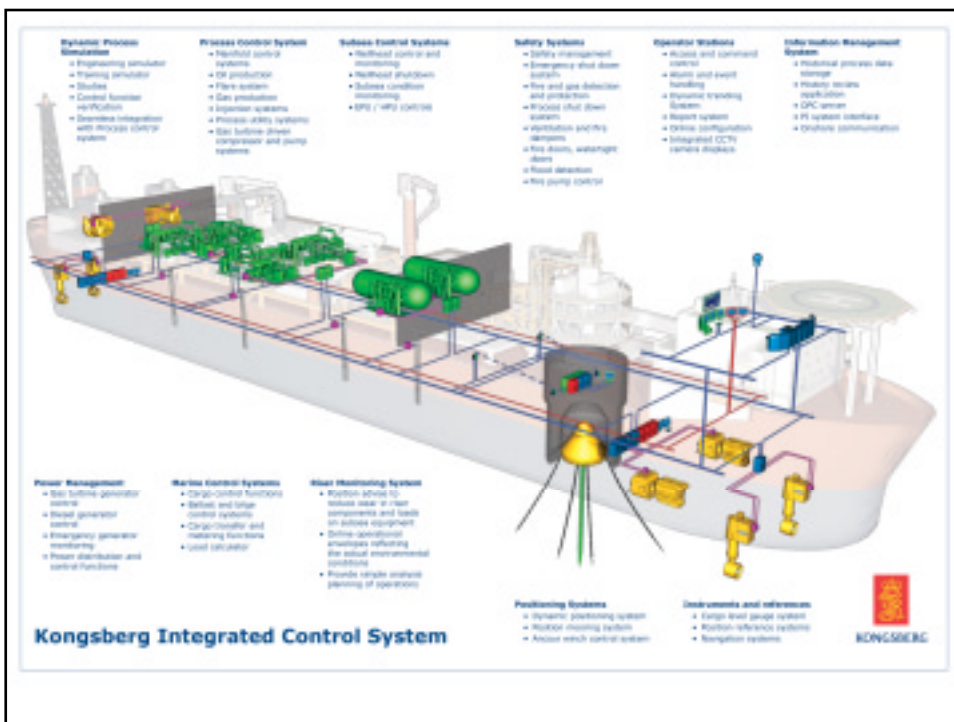
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As a starter – who should care?

- All players have a number of more or less specific rules and regulations to comply with.
- Manufacturers are looking for competitiveness – not for solutions to be integrated into
- Yards are looking for faster – in respect of installation - and cheaper solutions
- Ship owners does not necessarily ask for integration – but demands the functionality integration can provide
- Classification societies check solutions towards own rules and regulations – no premium for aspects of integration
- A classical example of sub optimizing...
- ... and leaves little room to improve on solutions

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Lessons learned from Oil & Gas industry – what is done?

- The owner – end-user – has taken responsibility
- The specifications are functional-oriented – main focus on operation.
- One actor appointed as system integrator – with great responsibilities – makes room for preparations towards third party manufacturers
- System components not only selected by price and/or functionality – more focus on ability to be integrated
- Focus on standard communication
- Focus on operability
- Focus on work organization and best practices
- But – this attitude has its price..

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It all comes down to one item – cost..

- Expectation regarding cost level is as always – down
- Functionality is difficult to distinguish between – most manufacturers tell the same story..
- The main contributor to low cost and acceptable quality is – standardization and use of tools
- Standardization offers less variation, less tailor making, less innovation – but more reliability (“well-proven”), less “surprises”, shorter delivery times,..
- Focus has to be on how the equipment is manufactured – specifically how the software development process is controlled – and how “innovation” is controlled
- Test and validation of all parts has to be documented and verified towards agreed standards – including interfaces to other (yet unknown) systems.
- Someone has to be given – and get paid for – the responsibility of inter system integration

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The KONGSBERG approach...



▪ ..is to utilize technology and competence between markets

▪ ..is to focus on integrateability – both internal and external

▪ ..is to try to understand the end-users requirements - not only the customers

▪ ..is to control the innovation process – both internal and external

▪ ..is to take control over all critical components – regardless of their origin

▪ ..is to ensure “free float of information” inside the system – and into/out of the system


▪ ..is to open up the vessel infrastructure for remote activities

▪ ..is to use and provide efficient tools for configuration and production

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... will contribute to



▪ Less down-time – a more complete, verified, solution

▪ Less maintenance due to more optimal operation of onboard equipment

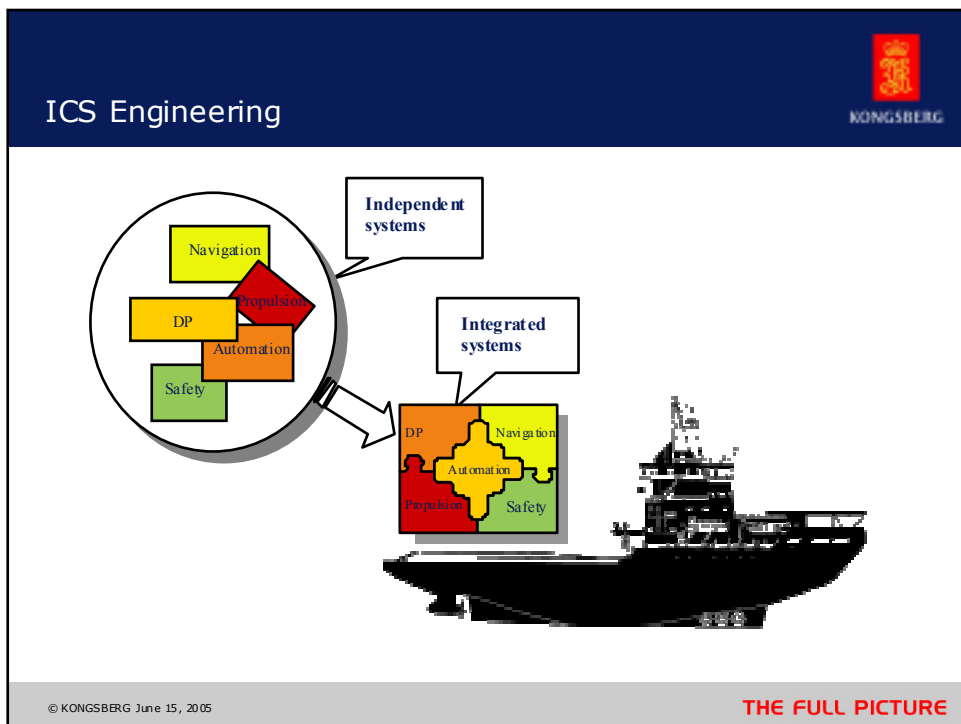
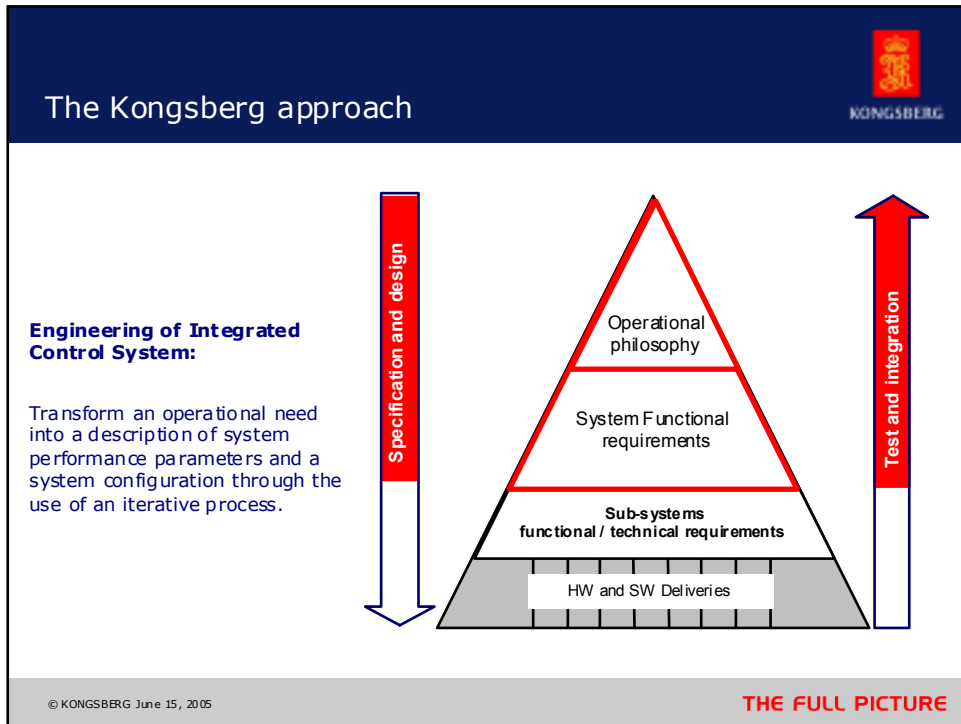
▪ Safer and more environmental friendly operation

▪ Simpler and less expensive maintenance


▪ Advanced functionality concerning remote diagnosis, maintenance, service and operation – the full picture

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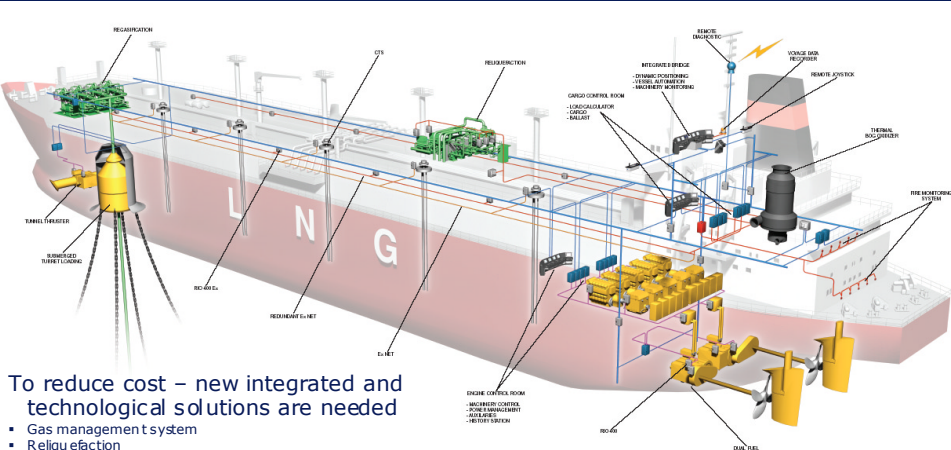
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4th generation LNG



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To reduce cost – new integrated and technological solutions are needed

- Gas management system
- Reliqu efaction
- Regasi fication
- Gas combustion
- ST L (APL) solutions
- Al ternative Propulsion
- DP

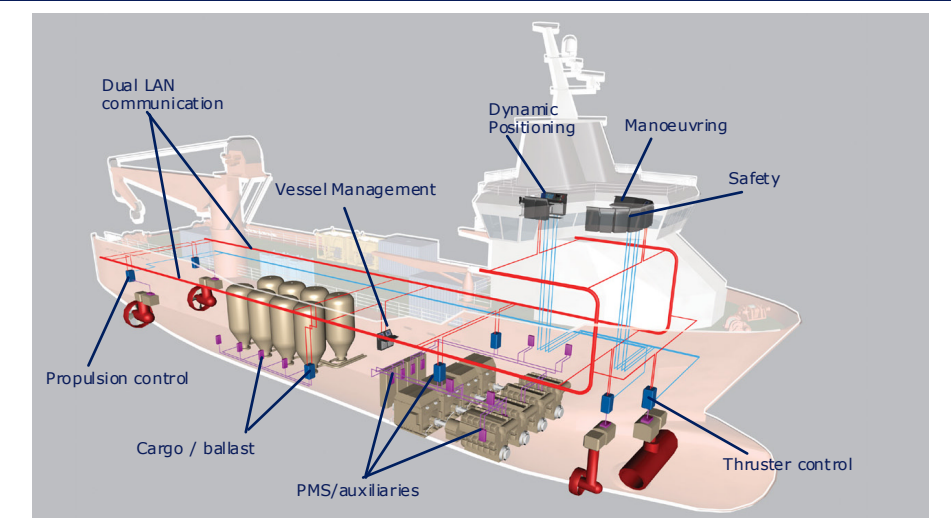
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Seamless Integration of Marine Control



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Dual LAN communication

Vessel Management

Dynamic Positioning

Manoeuvring

Safety

Propulsion control

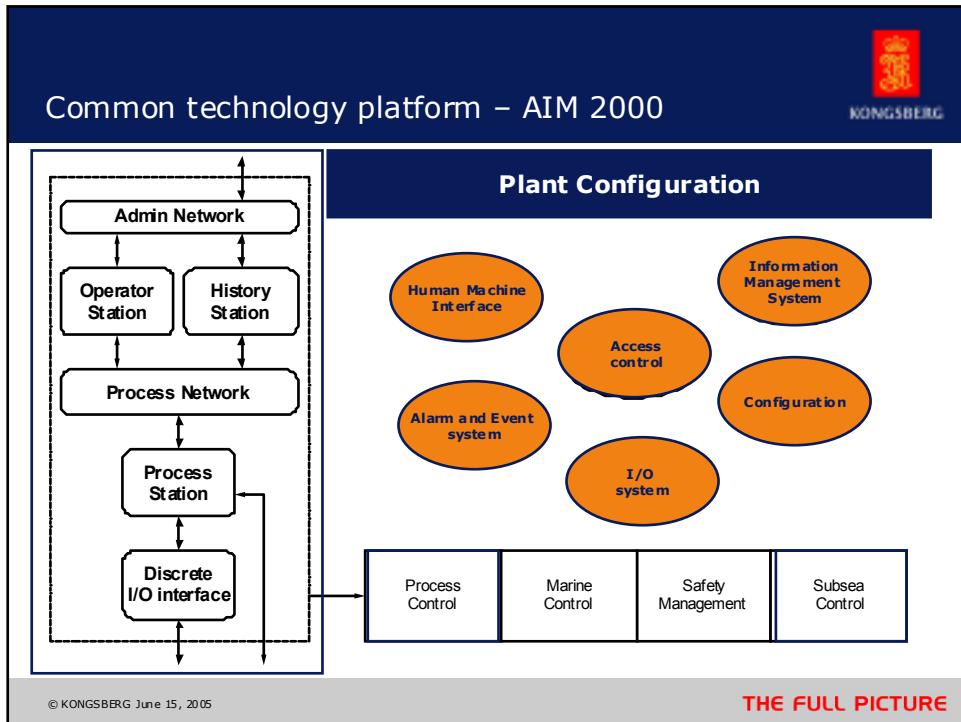
Cargo / ballast

PMS/auxiliaries

Thruster control

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KONGSBERG technology


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- High reliability
- Ease of operation
- Easy maintenance
- Reduce building cost

Our customers benefit from our common technology base – it reduces life cycle cost!




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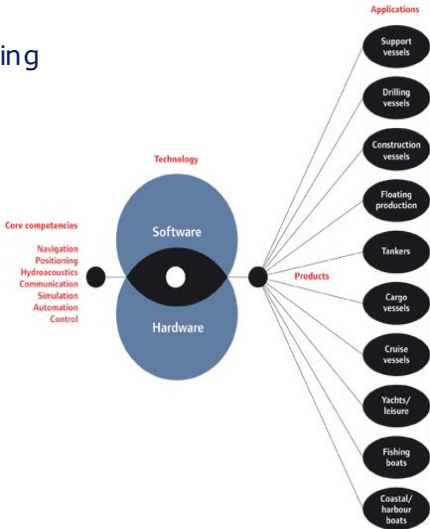
Everything is connected



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Focus on core competencies, building leading market positions

- Dynamic positioning & navigation
- Marine automation
- Process automation
- Hydroacoustics
- Satellite positioning & AIS
- Marine IT
- Marine electronics - SIMRAD



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