

## Digital Ship

Managing the risk of ship control, monitoring and alarm systems

NOR SHIPPING  
9 June 2005

### Getting the right system... ...and getting the system right.

A guide for serious buyers and makers

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## Presentation overview

### Digital Ship

Managing the risk of ship control, monitoring and alarm systems

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- What is the right system?
- How do you get the right system?
- Which risks (frequency \* consequence) are 'they' talking about in the conference title 'Managing the risk of ship control, monitoring and alarm systems' – and from which perspective?
- How are such risks handled in everyday life?

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## What is the right system?

- In this presentation, the perspective is buyers and sellers of integrated systems.
- The right system in buyers terms
  - the right system is the system that does what you want it to do, without trouble, days in and days out.
  - the right system is also a good bargain – value for money – and if something does go wrong, the right system is easily and quickly fixed, and at a reasonable price.
  - Finally, the right system makes you stick to that particular vendor.
- The right system in sellers terms
  - the right system is a system that is doesn't give you trouble during engineering, production, commissioning, guarantee and service.
  - the right system is that gives you a bit on the bottom line.
  - the right system is a system that makes clients come back, and gives you a good market position and reputation.

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## Did you always get the right system?



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## Managing risks – which risks?

- Buyer's main risk: To acquire a system that is 'not right'.
- Characteristics:
  - System does not provide the expected features;
  - System does not fit the intended operation of the ship;
  - System does not fit the profile of the crew (culture, language, training, skills);
  - System does not fit navigation and communications suites on board, and lacks in terms of interoperability and interconnectivity;
  - System is non-standard, cannot easily be maintained world-wide, or requires scarce, specialist knowledge for maintenance and modifications.
  - System does not perform over time, fails unacceptably often or with unpredictable or outright hazardous consequences;
  - System depends on technology outside the control of the supplier, and thus cannot be reasonably supported, extended, modified or upgraded;
- Potential main consequence:
  - Lack of commercial performance leading to complete renewal of system.
  - Disruption of commercial relation with Manufacturer.

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## Managing risks – which risks?

- Manufacturers main risk: To supply a system that is 'not right'.
- Characteristics:
  - The system does not fit into context of the specific ship, and cannot be configured to do so competitively;
  - The system does not provide the required functions, or cannot be made to do so;
  - The system price is not competitive, due to one or more of the following:
    - The system is too expensive to engineer;
    - The system is too expensive to integrate to other systems;
    - The system is too expensive to commission;
  - The system is unreliable, fails too often, or is otherwise is too expensive to maintain, too expensive to expand, or too complicated to oversee;
  - The system core functionalities or mechanisms depend on hardware, firmware or other factors outside of manufacturers control;
- Potential main consequence:
  - To loose the particular client;
  - To go completely out of business.

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## Matching the risks...note the commonality!

Buyer	Seller
System does not provide the expected features ;	The system does not provide the required functions , or cannot be made to do so ;
System does not fit the intended operation of the ship;	The system does not fit into context of the specific ship, and cannot be configured to do so competitively.
System does not fit the profile of the crew (culture, language, training, skills)	The system does not fit into context of the specific ship, and cannot be configured to do so competitively.
System does not fit navigation and communications suites on board, and lacks in terms of interoperability and interconnectivity;	The system does not fit into context of the specific ship, and cannot be configured to do so competitively.
System does not perform overtime, fails unacceptably often or with unpredictable or outright hazardous consequences ;	The system is unreliable, fails too often, or is otherwise is too expensive to maintain, too expensive to expand, or too complicated to oversee ;
System depends on technology outside the control of the supplier, and thus cannot be reasonably supported, extended, modified or upgraded;	The system core functionalities or mechanisms depend on hardware, firmware or other factors outside of manufacturers control
	The system price is not competitive, due to one or more of the following: <ul style="list-style-type: none"> <li>•The system is too expensive to engineer;</li> <li>•The system is too expensive to integrate to others systems;</li> <li>•The system is too expensive to commission;</li> </ul>
System is non-standard, cannot easily be maintained worldwide, or requires scarce, specialist knowledge for maintenance and modifications.	

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## Sample analysis

System does not perform overtime, fails unacceptably often or with unpredictable or outright hazardous consequences;	The system is unreliable and fails too often;	Inadequate 'System Design Specification'
		Inadequate SW development methods
		Inadequate 'Test Specification'
		Inadequate 'Acceptance Criteria'
		Inadequate manufacturers QA/QCs system
	The system is too expensive to maintain;	Inadequate SW development methods
		Inadequate modularity or configuration tool
	The system is too expensive to expand;	Inadequate modularity or configuration tool
	The system is too complicated to oversee;	Inadequate SW development methods

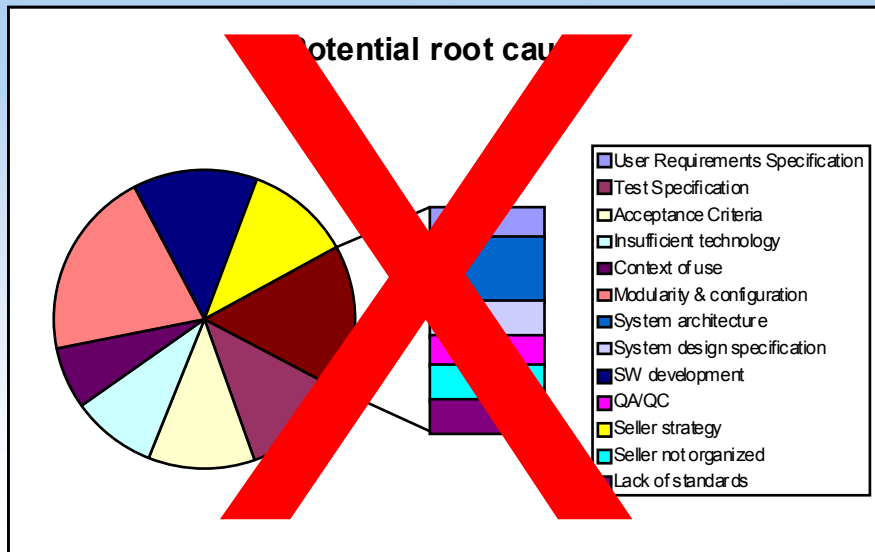
- Table shows a sample (subjective and probably un-scientific) breakdown of risks to groups of 'root causes'
- Methodology applied for all the risks
- Analysis is performed on result....

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## Analysis



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## Grouped summary of (potential) root causes

- Manufacturers business concept:
  - Seller QA/QC
  - Seller Strategy
  - Seller support organisation
- International Standardisation
- Manufacturers general product:
  - Insufficient Technology
  - System Development Methodology
  - System and Configuration Modularity
  - System Architecture
- Customisation:
  - Context of Use
  - User Requirements Specification
  - System Design Specification
  - Test Specification
  - Acceptance Criteria

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## Implications – Seller's business concept

- Identified risks:
  - Insufficient seller QA/QC
  - Unsatisfactory seller strategy
  - Inadequate seller support organisation
- Sensitive subject! Best advice to potential buyers: Take very, very careful note of how seller runs his business:
  - Is there any doubt that seller dependently can provide the functions you require? Checkmarks:
    - Seller domain knowledge and engineering capability?
    - Seller use/approval to ISO 9001, ISO 17894, Class?
    - Seller track record...?
  - Is there any doubt that seller dependently can support you throughout system lifetime? Checkmarks:
    - Seller control of product technologies/deliveries/components/know-how/software etc.?
    - Seller support organisation
    - Seller critical mass to remain in market for the system lifetime?

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## Implications – International Standards

- Identified risk:
  - Insufficient international standards
- State-of-the-art: Most (all...?!) commercially available AMC systems uses a blend of architecture and communications standards – but no combination is the same, and some choices are better suited to some purposes than others...
- Best advice to potential buyers: Checkmarks:
  - Are sellers particular choices well documented;
  - Are the pro's and con's of sellers choices understood in your organisation;
  - Are your specific needs, now and foreseen, (for instance for integration or interaction) well supported by sellers choices;
  - Hobby-horse: Without evidence, don't be convinced that shore-based solutions, implementations and technologies are well suited for shipboard use!

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## Implications – Sellers general product

- Identified risks:
  - Insufficient Technology
  - Insufficient System Development Methodology
  - Insufficient System and Configuration Modularity
  - Inadequate System Architecture
- Best advice to potential buyers: Take the time to see, discuss, understand (and approve of!) how seller produces the product.  
Checkmarks:
  - Is the system architecture and hardware/firmware/software dependable, robust, flexible, extensible, proven-in-use – and suitable for marine use?
  - Does seller have a robust, bullet-proof and sensible way of handling customisation, or is everything 'invented' for every new installation, making changes hard, and quality a bit of a gamble?
  - Does seller have a solid grip on the entire development process, hardware, firmware and software alike?
  - Does seller have capability to solve future challenges that may provide you with an additional benefit?

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## Implications – Customisation of YOUR system

- Identified risks:
  - Insufficient specification:
    - Context of Use
    - User Requirements Specification
    - System Design Specification
    - Test Specification
    - Acceptance Criteria



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## Implications – Customisation of YOUR system

- Identified risks :
  - Insufficient specification (and thus, insufficient process management):
    - Context of Use
    - User Requirements Specification
    - System Design Specification
    - Test Specification
    - Acceptance Criteria
- Sensitive subject! Shared seller & buyer responsibility!
- Best advice to buyers: Make seller a real stakeholder in project, if at all possible.
- Best advice to sellers: Ensure that customisation is very efficient, safe, robust, in order to support buyer's needs, now as well as in the future;
- Best advice to potential business partners: Take the time to see, discuss and agree on structured development methodology, with particular emphasis on UCD. Checkmarks:
  - ISO 13407
  - ATOMOS II 1.7
  - ISO 15288

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## In conclusion...give us a ring...!



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