

Lloyd's
Register

Digital
Ship



Nor-Shipping 2005

**MANAGING THE RISKS OF INTEGRATED
SHIP CONTROL SYSTEMS
value for money in technology investments**

by

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9th June 2005



Purpose of event

- A review of the state of the art in this area
- A greater, shared understanding of the latest changes and issues related to use of software intensive systems in marine control applications
- Identification of improvement actions for the industry in this area
- A report of the findings of the discussion in an article in The DigitalShip
- Chance for attendees to ask questions.



Agenda

- Introduction (what's the problem?)
- What we need
- What we can provide
- Discussion
- Lunch (13:30)
- "Solutions"
- Discussion
- Close (16:30)

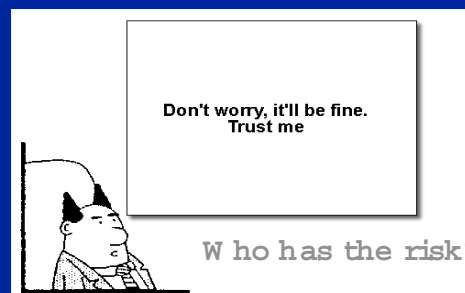


Discussion sessions

- Please write down questions or issues that you think are important and hand them to me at the breaks.
- The discussions will be recorded with your permission.
- In any report your issues, questions and comments will not be attributed.

IT risks during construction

- acquisition policy
- specification changes
- untraceable software
- poorly-focused testing
- quick-fix solutions
- unexpected behaviour
- delay



IT risks through life

- unexpected behaviour
- degraded performance / loss of service
- maintenance
- spares
- training
- incidents:
 - Royal Majesty
 - Bright Field
 - Serenity



The underlying problems



- Requirements
- Safety
- Quality
- Human Error
- Documentation



Questions

What are the consequences of unexpected behaviour or failure?

What's the consequence of poor or superficial integration?

What are the chances of human error?

What is the real cost of keeping it working?

Can the crew really work safely without it?

ISO TC8 SC10 17894 : 2005

Ships and marine technology - Computer applications - General principles for the development and use of programmable electronic systems in marine applications

1 Scope

2 Conformance

6 Use of this International Standard

7 Twenty Principles and Criteria

A Concepts

B Guidance on principles

C-E Guidance on lifecycle, outputs and application of the Principles



- **P4 Functions shall be appropriately allocated between users and PES.**
- P4.1 Functions that are outside the capabilities and limitations of human operators should be allocated to the PES.
- P4.2 The complexity of user allocated functions should be matched to user skills and abilities.
- P4.3 The functions allocated to the user should form a meaningful set in terms of the task goals and user workload.

Commentary "... One key aspect is that the set of user tasks should not just be those left over after automating as many as possible; with the expectation that the flexibility of the user will make the PES work overall. The set of user tasks should form a meaningful job, with special attention to safety-related functions (such as alarm acceptance or protective shutdowns) and their achievement under stress conditions. ..."

Specific Guidance "... The operational philosophy and the resulting allocation of functions between the technology and the user should be assessed throughout the operational life of the ship. This should be based on longer-term studies as well as testing and initial trials ..."

Source References [BS 61069-1] §4.3.2, [IACS GUIDE] §3.1.2, §4.8.3, [ISO 13407] §6.3, [ISO 9241-10] §3.2

Marine Services



Objective of ISO 17894

"The system shall be demonstrably suitable for the user and the given task in a particular context of use.

It shall deliver correct, timely, sufficient and unambiguous services to its users and other systems.

The components of the system shall perform correctly throughout the system's lifecycle."



Lifecycle principles

- L1 All PES lifecycle activities shall be planned and structured in a systematic manner.
- L2 The required level of safety shall be realised by appropriate activities throughout the lifecycle.
- L3 User centred activities shall be employed throughout the lifecycle.
- L4 Verification and validation activities shall be employed throughout the lifecycle.
- L5 All parties involved in lifecycle activities shall have and use a Quality Management System.
- L6 Existing requirements for marine systems shall be taken into account throughout the lifecycle.
- L7 Suitable documentation shall be produced to ensure all PES lifecycle activities can be performed effectively.
- L8 Persons who have responsibilities for any lifecycle activities shall be competent to discharge those responsibilities.
- L9 The PES configuration shall be identified and controlled throughout the lifecycle.



Product principles

- P1 The PES shall be free from unacceptable risk of harm to persons or the environment.
- P2 In the event of failure the PES shall remain in or revert to the least hazardous condition.
- P3 The PES shall provide functions which meet user needs.
- P4 Functions shall be appropriately allocated between users and PES.
- P5 The PES shall be tolerant of faults and input errors.
- P6 The PES shall maintain specified levels of accuracy, timeliness and resource utilisation when used under specified operational and environmental conditions.
- P7 Unauthorised access to the PES shall be prevented.
- P8 The PES shall be acceptable to the user and support effective and efficient operation under specified conditions.
- P9 The operation of the PES shall be consistent and shall correspond to user expectations of the underlying process.
- P10 The interaction between the PES and the user shall be controllable by the user.
- P11 The PES shall support proper installation and maintenance, including repair and modification.



First discussion session

**Are manufacturers meeting
shipowners requirement for
minimised risk control systems?**

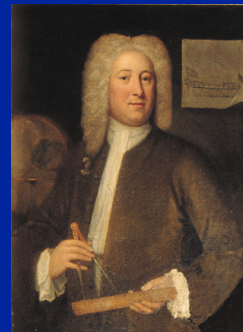
Lunch

Please be back at 14:30



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Marine Services

managing ICS risks

Second discussion session

The way forward for you



Marine Services

managing ICS risks

Building better business



**Working together to improve
business performance**

