QMHSE 2013 – Lars Bagger Hviid, Human Factor Specialist

Application of CRM in Team Based Well Control Training

April 2013

MAERSK
DRILLING

Human Factors in Maersk Drilling

- Psychologist, PhD
- Develop personal- and process-safety focus tools
- Survey safety culture and support the further development of the safety culture
  - Support the effort for increased complience with management system, safe practices and safety barrier management
  - Fight against complacency/habituation/risk normalization through safety culture program
- Help develop HF aspect of Team Based Well Control Training.

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Agenda

- What is drilling all about?
- What are our challenges as drilling contractor?
- How do we try to meet these challenges?
- How does HF/non-technical skills play into this
  - What is our focus?
  - What is it we are trying to achieve?

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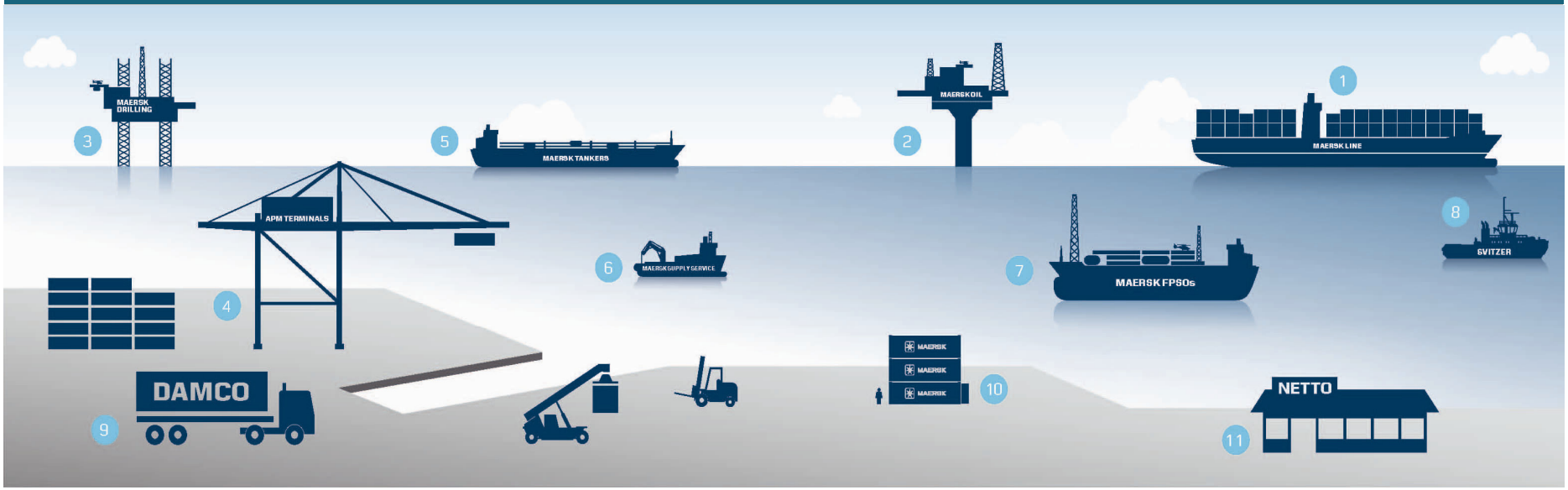
Group Overview

Container activities | Terminal activities | Oil & Gas activities | Tankers, offshore and other shipping activities | Retail activity | Other businesses



- 117,000 employees
- Some 70,000 shareholders
- Controlling stake held by A.P. Møller and Chastine Mc-Kinney Møller Foundation

1: Maersk Line
2: Maersk Oil
3: Maersk Drilling
4: APM Terminals
5: Maersk Tankers
6: Maersk Supply Service
7: Maersk FPSOs
8: Svitzer
9: Damco
10: Maersk Container Industry
11: Dansk Supermarked

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Maersk Drilling's fleet

26 drilling rigs, 7 newbuildings and 1 unit on management contract

Jack-ups

4 MSC CJ50-X100 MC
Delivered 2008 - 2009

2 MSC CJ70-150 MC
Delivered 2003 - 2004

2 Baker Pacific Class 375
Delivered 2007 - 2008

3 MSC CJ62-120/Hitachi
Delivered 1986 - 1993

1 BMC 350
Delivered 1984

Newbuildings

3 MSC CJ70-X150MD
Delivery 2013 - 2014

4 Samsung 96K drillships
Delivery 2013/2014

Semisubmersible

3 DWSS-21
Delivered 2009 - 2010

1 DSS 20-CAS-M
Delivered 2003

Other

10 x Barges
Delivered 1981-1998

One of the Youngest and Most Advanced Rig Fleets

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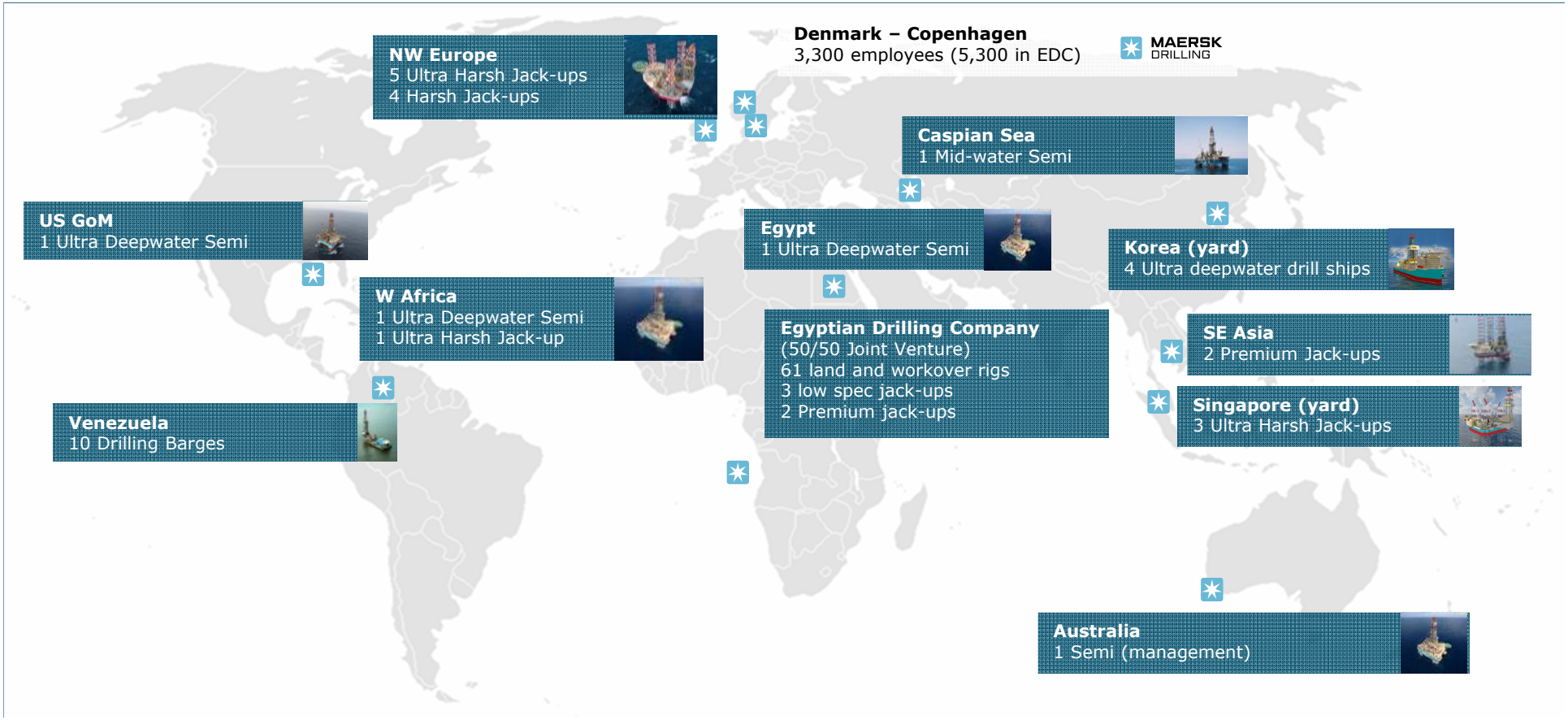
Maersk Drilling is a worldwide operator



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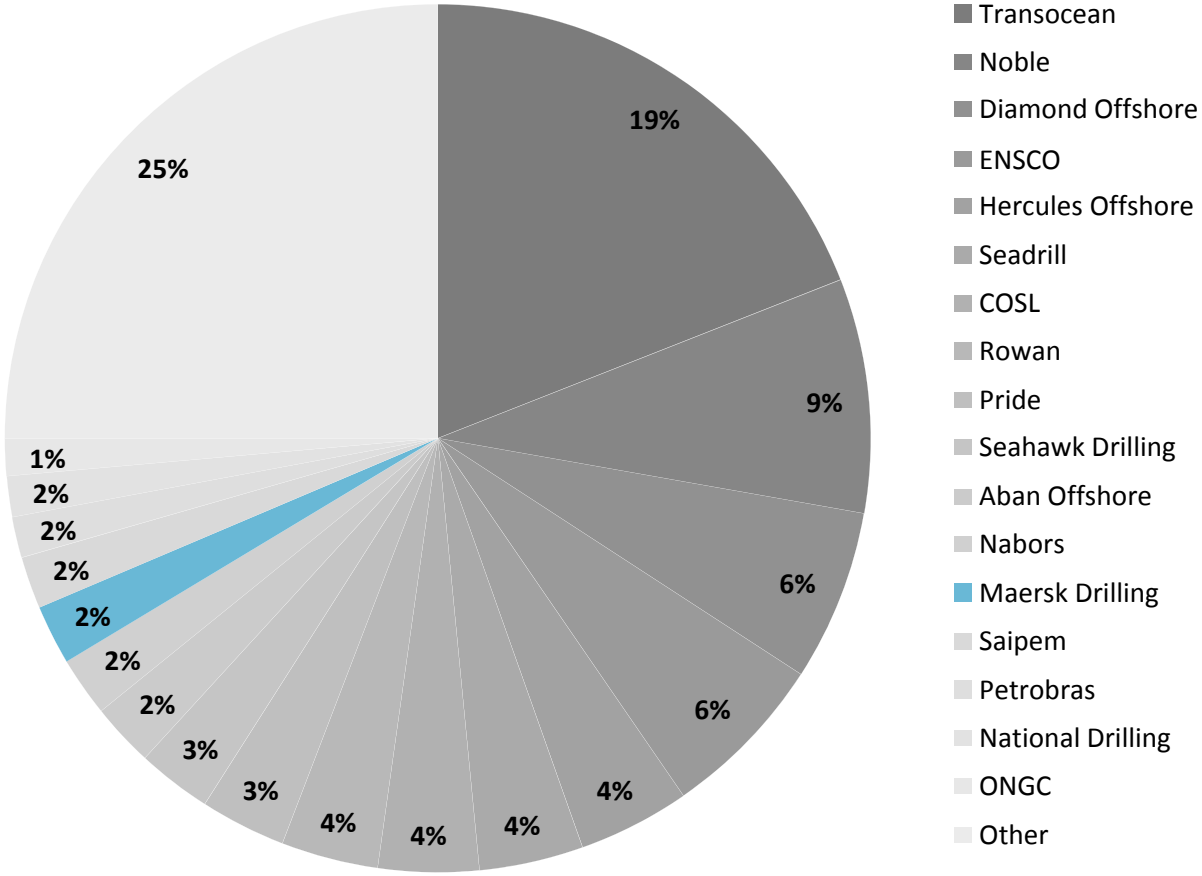
Drilling Market Share

Global market shares (jack-ups, semi-submersibles, drillships)



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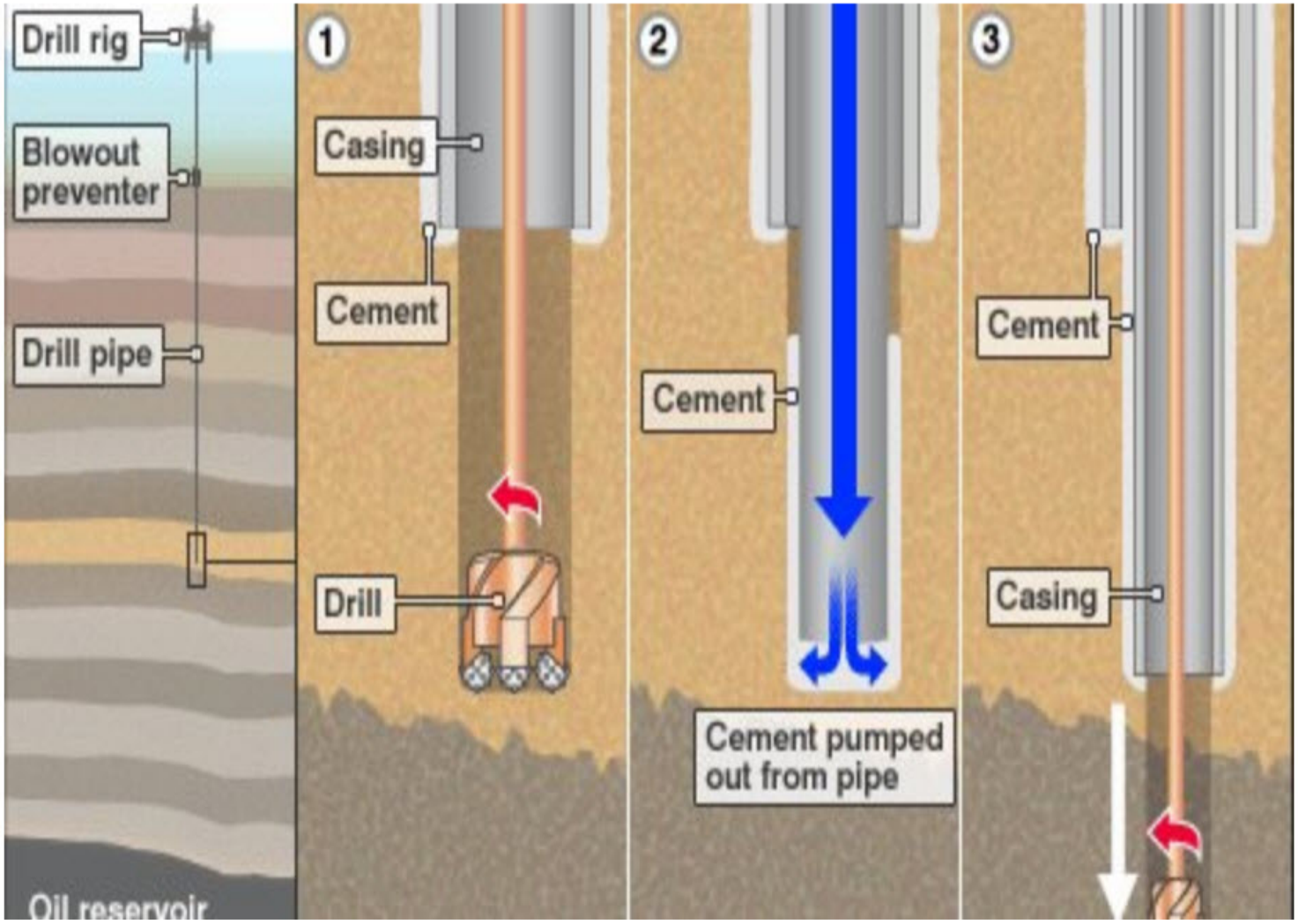
Offshore drilling explained (two slide)

- Drilling a hole in the ground in order to discover and extract hydrocarbons and gas from the underground.
- Drilling rigs (owned by drilling contractors) are hired by an oil company (has the lease for the plot of land where exploration and extraction takes place)
- Drilling rigs are usually paid a day rate for performing the drilling service – Uptime and downtime – time is a lot money
- Main focus of drilling operation is to maintain hydrostatic pressure in the hole and the integraty of the formation

Reaching the reservoir



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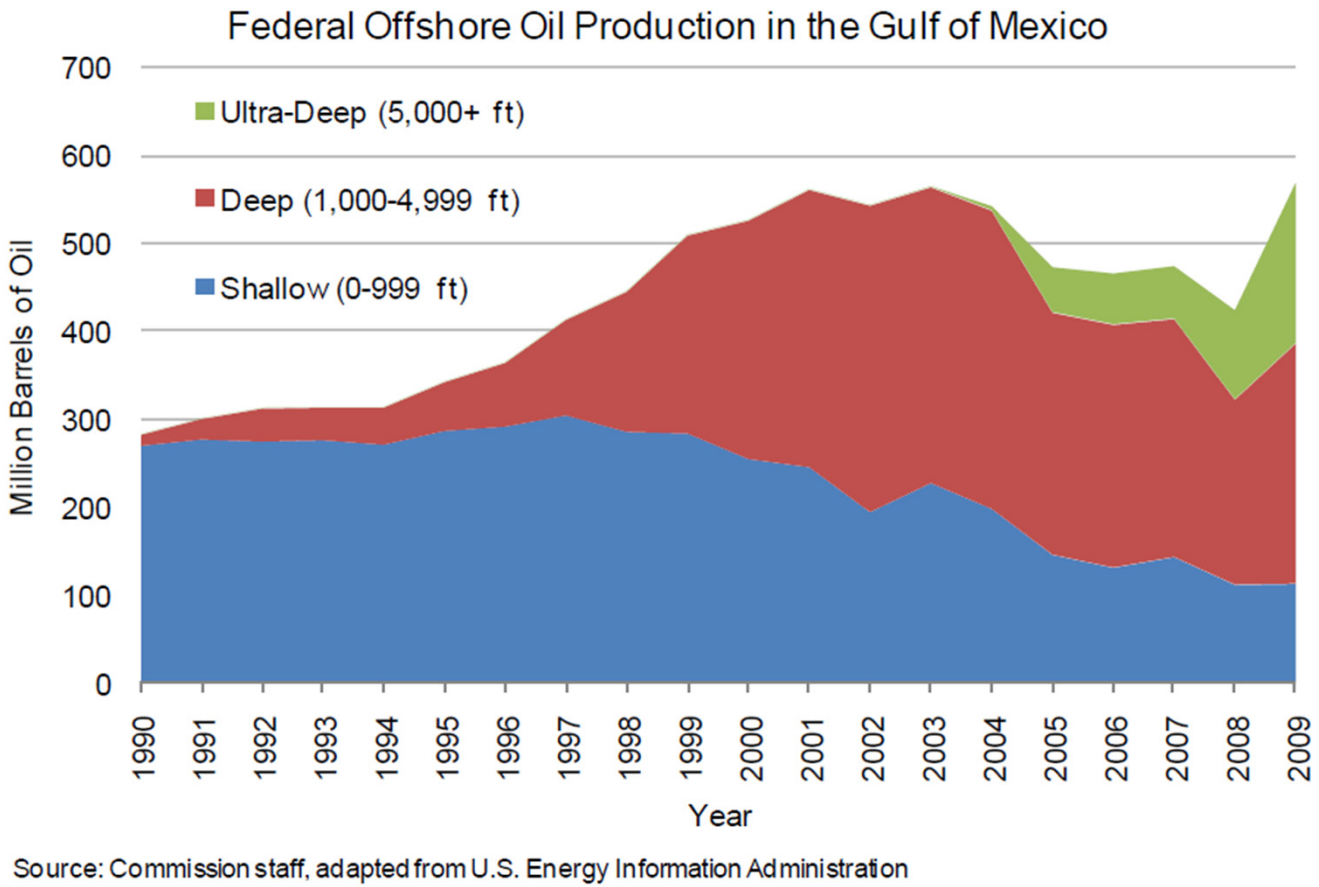
The ”easy” oil has already been found…



Source: Commission staff, adapted from U.S. Energy Information Administration

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SINGAPORE

Why HF in Team Based Well Control Training?

- An internal task force was established post the Macondo incident to identify and develop advanced training simulations with the objectives to:
  - Enhance drilling teams ability to handle worst case scenarios
  - Pro-actively plan and prepare for drilling operations
  - Focusing on crew resource management and human factor aspects in **Team Based Well Control Training**
- Joint partnership between Maersk Training and Maersk Drilling
  - Partly founded by the APMM Foundation

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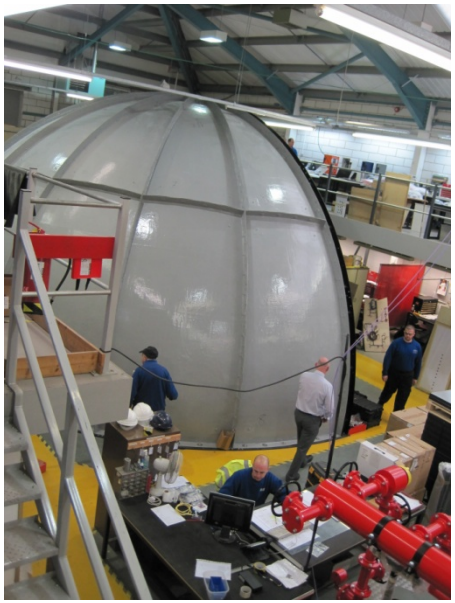

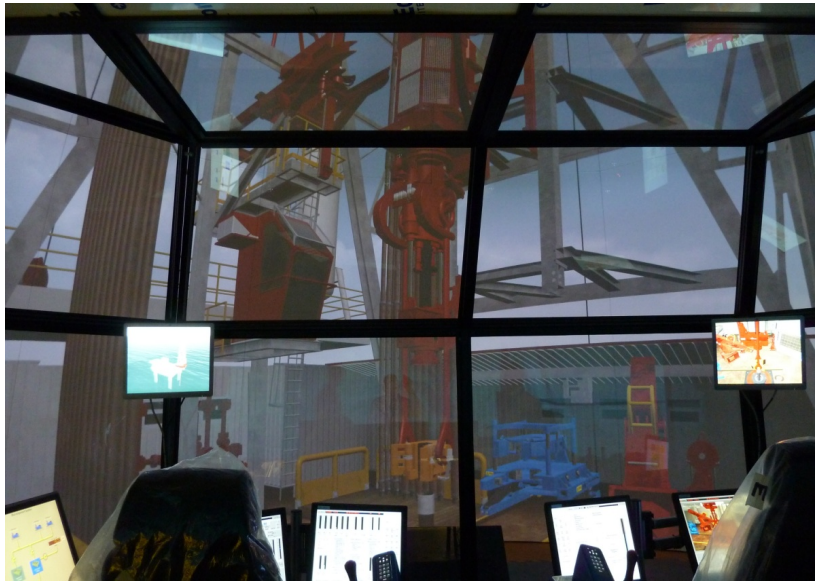

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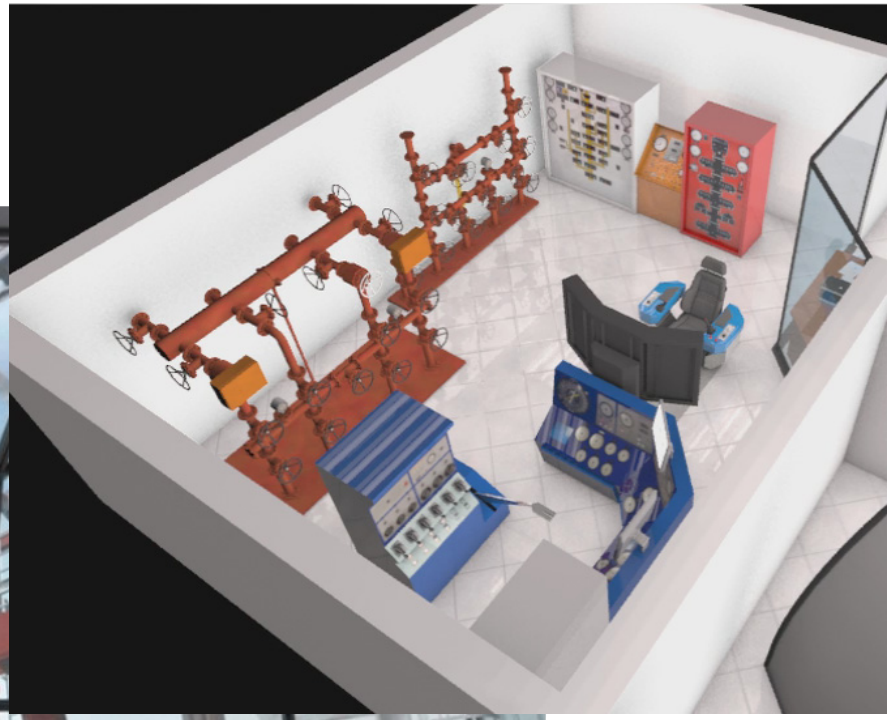
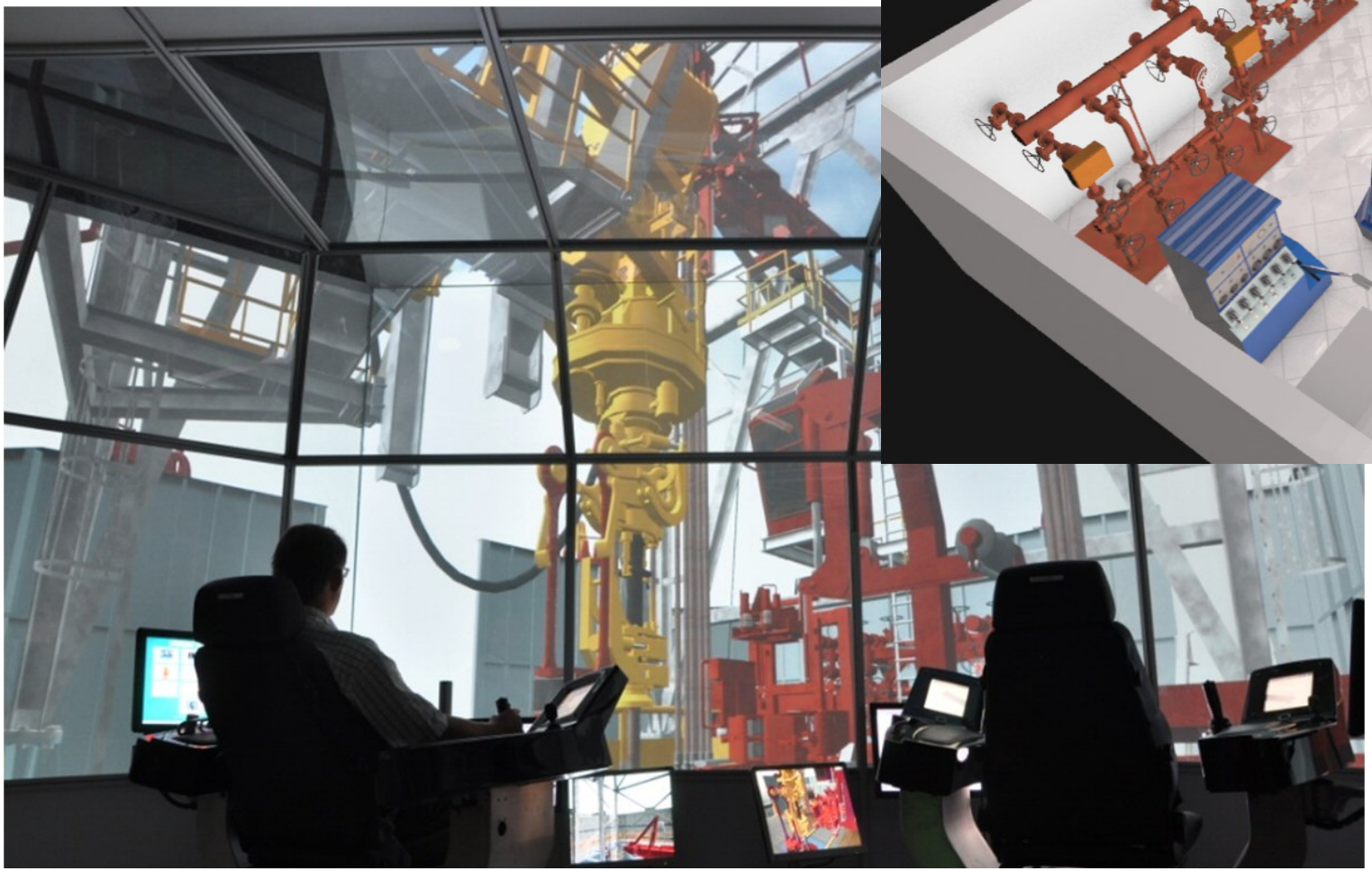
DRILLING
SYSTEMS

Drilling simulator





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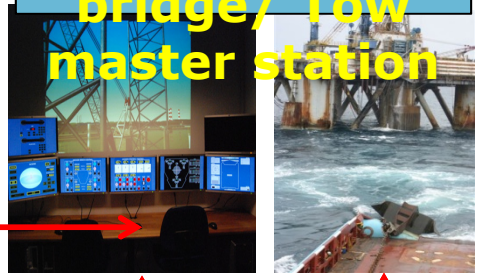
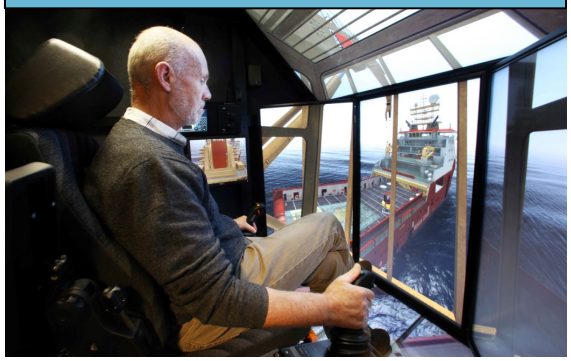
Long-term

Rig control room

Offshore support vessel bridge/ Tow master station

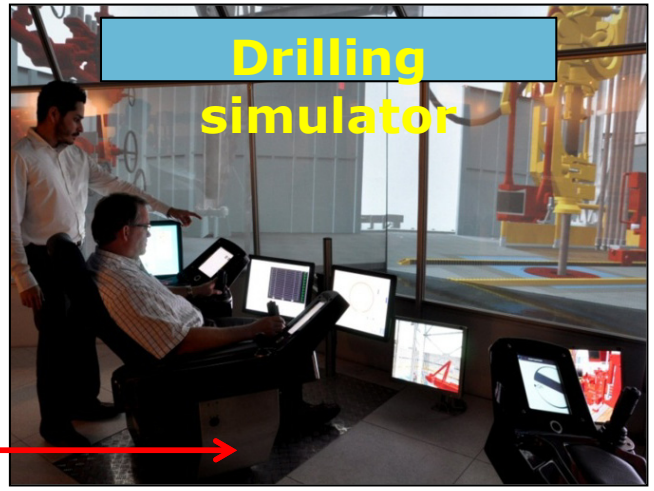


Offshore crane



Engine-, control-, switch board room

Drilling simulator



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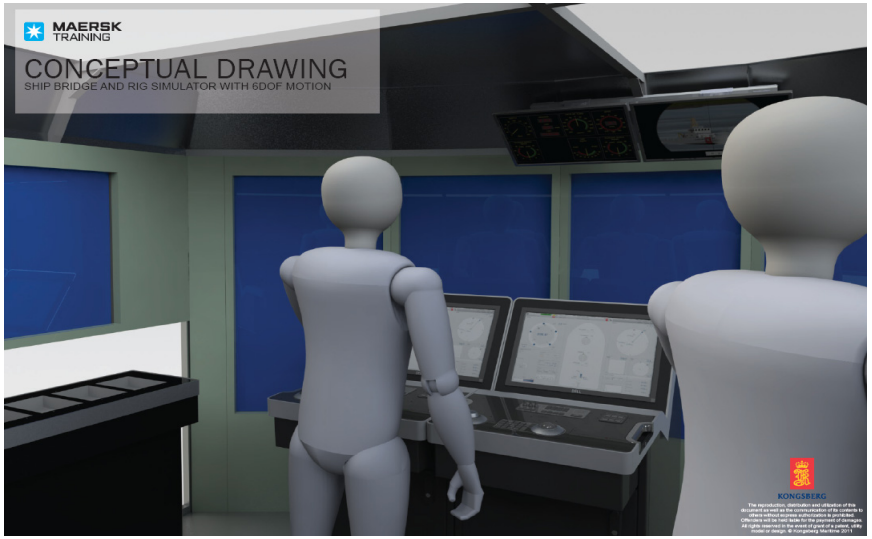
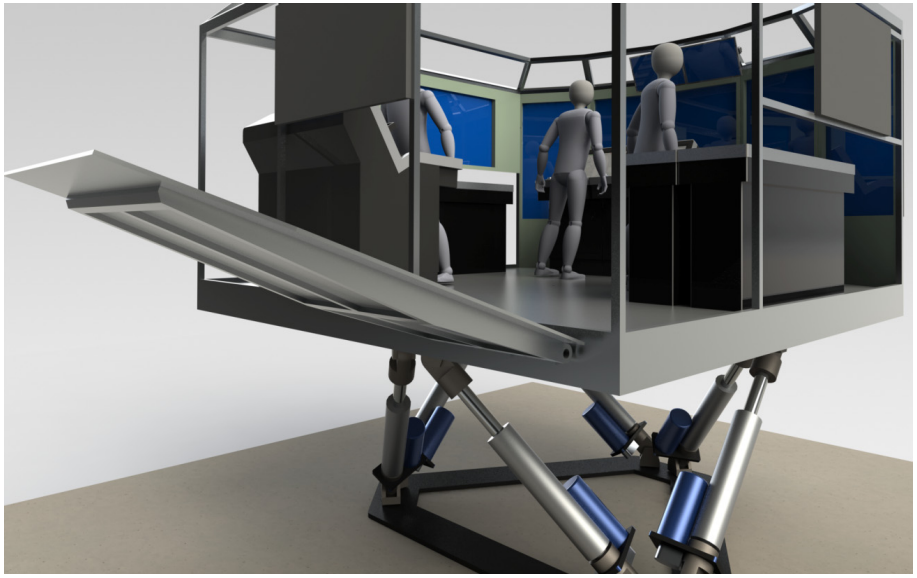
Rig control room/ Offshore bridge simulator – Fact sheet

- Dynamic Positioning
- Stability D-Rig and Drillship
- Ballast control D-Rig and Drillship
- Management of Major Emergencies
- Riser Management System
- Towmaster room
- Vendor: Kongsberg





Engine Room Simulator - Courses to be conducted

- **2013/2014**
- Scenarios training: Normal operation exercises, Scenarios where a fault occurs that needs to be corrected
- Power Management System
- Consumption optimization
- Environmental compliance sustainability
- Engine room resource management to IMO/STCW
- Cases for semis engine room
- Root cause and trouble shooting on drilling equipment
- People skills (communication, leadership, conflict handling etc.)
- Interdepartmental training (Well-from-hell scenarios)

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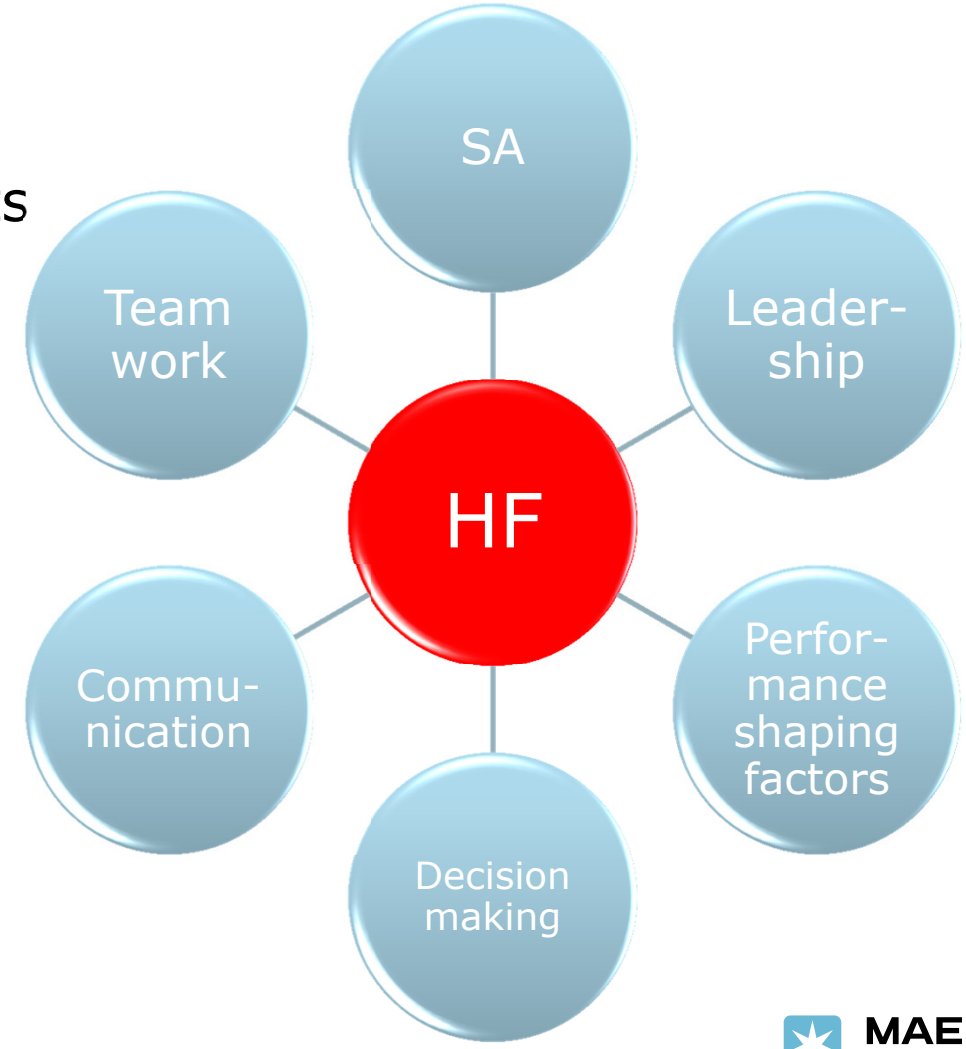
Present..

- Team based well control training of drilling crews
  - Standard package
  - Specialized package
- Rests on two compenents
  - Technical skills
  - Non-technical/HF/CRM
- Training
  - Theory
  - Virtual environment
  - Feedback and review
  - Technical assessment



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Training structure

- 5 day course
- Process is facilitated by 3 instructors – two technical (with drilling background) and one HF
- Key positions taken up by drill crew and customer representative
- Significant characters like: Mud logger, DFO, OIM, Rig Manager, etc..
- Close integration of technical and non-technical skills
- Group exercise around well control scenarios
- Exercises are recorded and used in feedback/review sessions – technical and HF components
- Individual feedback related to HF components

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Human Factors 1.

- Situational Awareness
  - Gather information
  - Analyzing and understanding the information
  - Anticipating future state, indentifying leading indicators /weak signals set in the planning
- Decision making
  - Identify possible options and assess the options (deliberate decision) – concensus?
  - Section option and communicate it
  - Impliment and review decision
- Team work/dynamics
  - Understanding team roles
  - Support and conflict solving
  - Utilization of resources – experts on shore; sleeping police men

Human Factors 2

- Leadership
  - Role in planning an preparation
  - Supporting and directing the team
  - Struture team effort
- Communication
  - Shared mental model (shared information – establish ”one map”
  - Asking/listening – practising techniques in order to avoid confirmation bias
  - Assertiveness
- Performance shaping factors (review one to one)
  - Self awareness (identify stress and fatigue)
  - Self control (coping with stress and fatigue)
  - Contribute/utilize own resources – group dynamics

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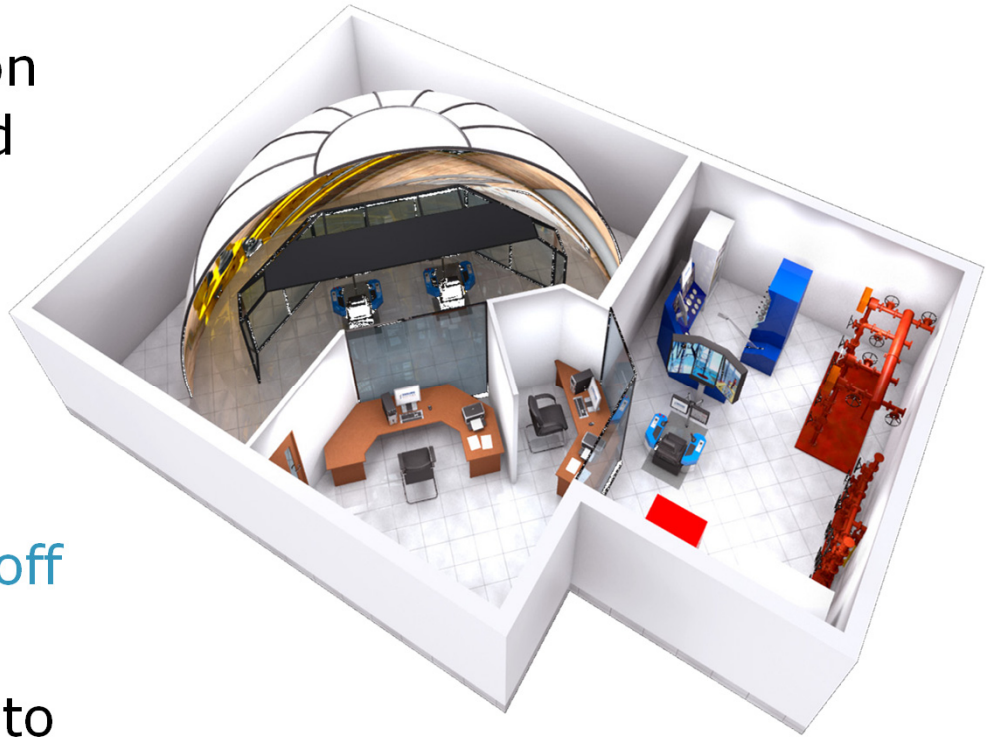
Set up and HF objectives

- The team has to:
  1. Identify well control situation (weak to strong signals) and close in the well.
  2. Plan potential solutions. Define what good looks like Identify potential ”Lagging” and ”leading” indicators ; define parameters and cut off – attach sleeping policemen
  3. Monitor progress according to plan and defined parameters – ID deviations/new Decision? New plan?



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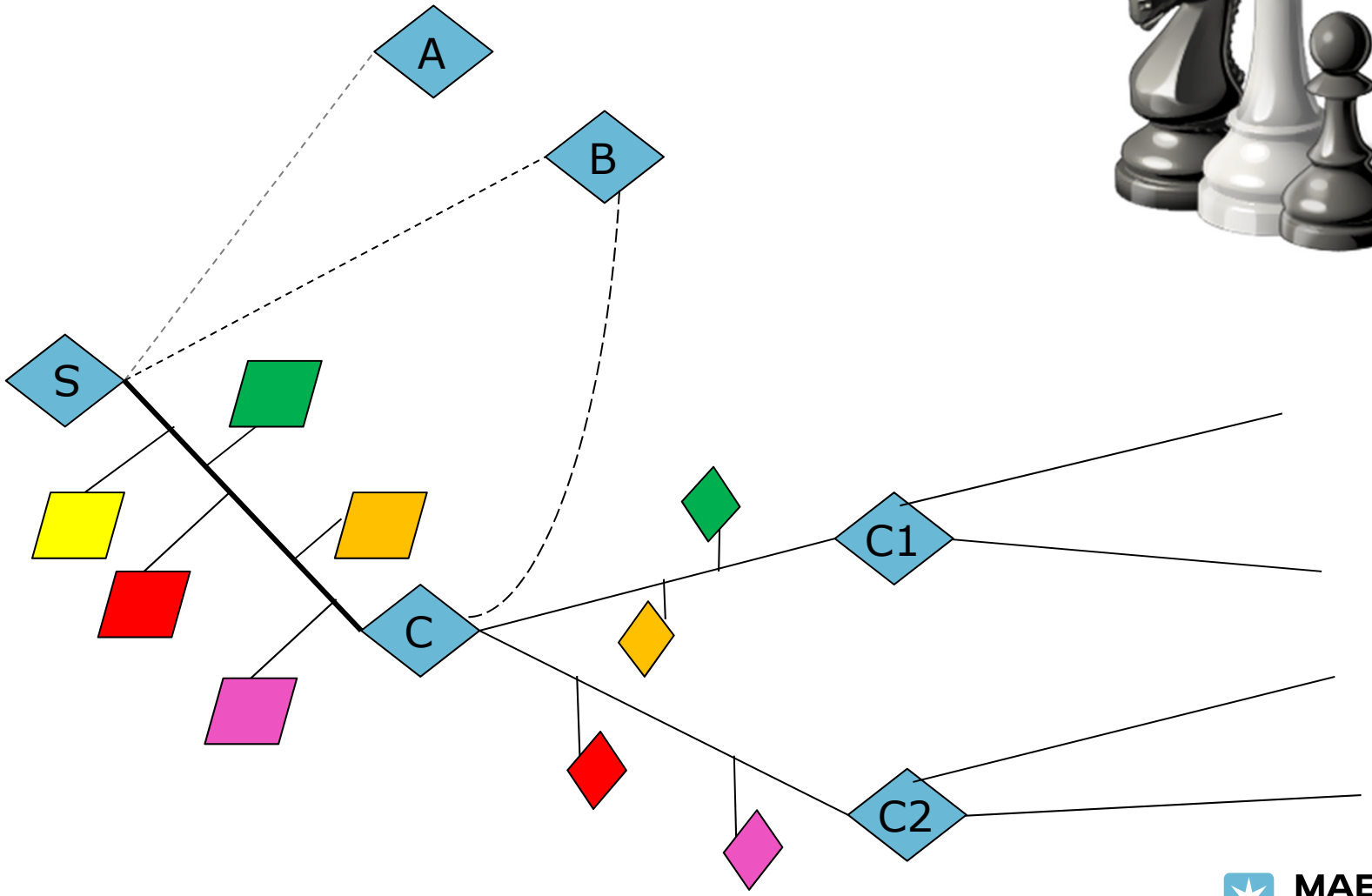
A game of chess



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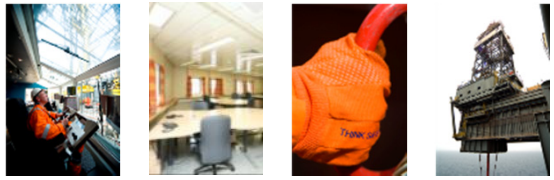
Vision



- Efficient and safe operations (Emergency response)
- To give a far more realistic training (rig/unit specific) experience compared to any other simulator environment on the market today
- To train crews in teams in mutual interactions between the different departments and operations
- Improve individual, leadership and team performance
- Succession planning (acceleration programs)
- To obtain a commercial advantage in the market place and receive appreciation by our key customers

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Please send questions & comments to:

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Thank You

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