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WINTER NAVIGATION
MOTORWAYS OF THE SEA

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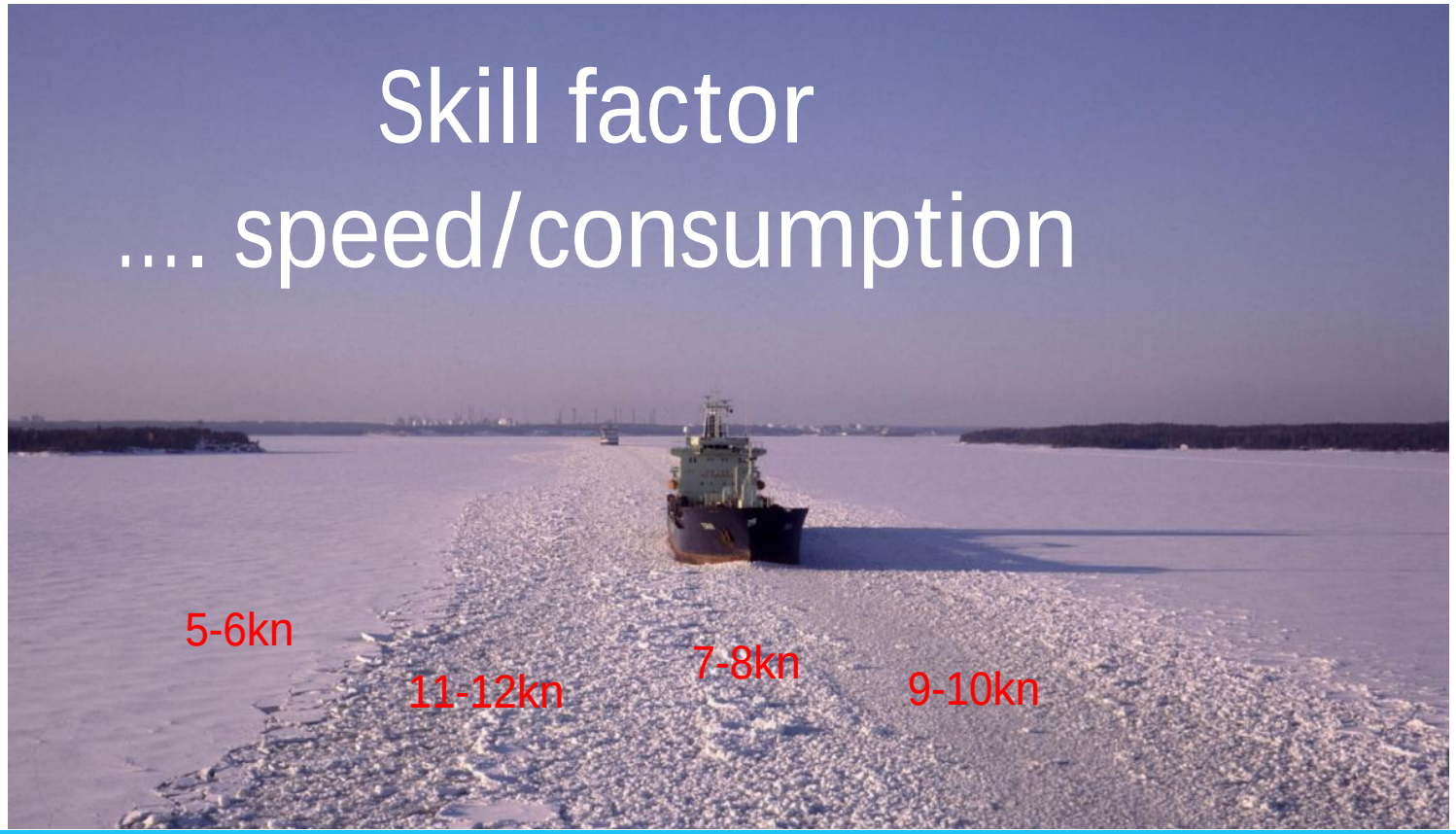
Activity 5 - Human element and training



Activity 5 Human Element & Training

WINMOS
Final Seminar 7 April 2016

Mirva Salokorpi, R&D Manager,
Maritime Simulation
7.4.2016

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Novia University of Applied Sciences

- Maritime Training Unit, Aboa Mare
- Long history: The navigation school was established in 1813 and became the first school to educate students to a profession in Finland.
- Master Mariners and Marine Engineers in Turku
- Electro Technical Officers in Subic Bay in the Philippines.
- A wide range of courses for professional seafarers and simulator-based training both to shipping companies and authorities all over the world.
- R&D Unit of Maritime Simulation established 3/2016

- Novia – the biggest Swedish-speaking University of Applied Sciences in Finland
- 4000 students
- 11 Bachelor´s & 3 Master´s Degrees in Swedish
- 5 Bachelor´s & 3 Master´s Degrees in English

Sub-Activity 5.1 - objectives

A desktop study defining the relevant skills and their components for ship officers operating their vessels in ice will be made in co-operation between experienced officers from the icebreakers and merchant vessels. The goal is to define operations, tasks and missions that need to be trained.

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SA 5.1. Relevant skills and compentence for ship officers

WINMOS Activity 5 – Human element and training

Sub activity 5:1 – Desktop study on defining relevant skills and competences for ship officers

Ahti Hyppönen & Magnus Winberg

Aboa Mare 2014

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Two parts of the desktop study

1. The existing international regulations and conventions in order to ascertain the requirements for winter navigation.
   - Also other relevant documents + existing training programs were studied
2. Interviews with experienced merchant marine shipmasters and icebreaker officers, in order to complement and clarify the training needs for Baltic winter navigation.

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Some instructions for the Training program (WINMOS SAP)

- Training for winter navigation must be divided in right proportions between theory and training in simulator. Theory part should focus on making good quality, safe and efficient route-plan of all available information of intended voyage. On all vessels this includes gathering reporting requirements about ice and weather information, ability to recognize different ice types and ice phenomenon, preparations for icing, towage etc.
- On merchant vessels it is especially important to be able to understand and follow icebreakers' orders, and on icebreakers it's an additional task to coordinate the traffic.

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Conclusion of the Desktop Study

- Existing programs are fairly comprehensive but some adjustments and review would increase their effectiveness.
- The training materials should be revised and updated as necessary.

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Objectives & Criteria of the SA 5.4

- Based on sub activity 5:1 a training program adapted to Baltic Sea's winter navigation conditions will be worked out by partners, simulator instructors and officers from the icebreakers and the merchant vessels operators. This training program contains also minimum requirements for simulators and ship models.
- This training program forms base of human skills required on board for efficient and safe winter navigation system. Further considerations amongst relevant authorities will be carried out to support competence requirements on voluntary or required basis.

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SA 5.1 & 5.4

Winter Navigation Course Plan will be published in spring 2016

WINTER NAVIGATION

COURSE PLAN

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8 theory lessons and 7 simulator exercises

- L1: Basics of ice operations
- L2: Voyage planning and preparations
- L3: Ship design for ice operation
- L4: Watch-keeping & ship handling in ice
- L5: Management issues
- L6: Engine & technical items, cargo handling & equipment
- L7: Safety & emergency equipment, survival
- L8: Ice-breaker assistance

SE 1: Introduction to simulator, ship model and ice characteristics

SE 2: Independent operation in relatively easy ice conditions, traffic

SE 3: Fairway navigation in fast and moving drift ice

SE 4: Navigation in various ice conditions including high concentration and moving ice fields and fast ice channel, traffic

SE 5: Procedures and communication in an icebreaker convoy

SE 6: Icebreaker-assisted operation

SE 7: Navigating in drift ice with high concentration near coastal shallows, poor visibility

Parallel exercises: Harbor maneuvering, navigating night-time (if available in the simulator used)

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The material includes basic necessary info…

- Routines during navigation in open and ice infested sea areas
  - In sub-zero temperature in open water possible freezing of deck and superstructures should be observed and prevented by adjusting speed and/or course. In darkness, deck lights or search lights should be used to observe possible ice accretion.
  - Lookout, radar and search lights should be used in open water to detect possible ice. Going around ice floes is often preferable. When turning near ice floes one should avoid hitting the stern in the ice. Also hitting large ice floes with high speed should be avoided.
  - Vessel readiness for ice should be checked in open water: searchlights functioning, engine preparations (shaft generator off, ready to maneuver), proper ballasting, sufficient GM
  - Often ice concentration increases gradually along the voyage towards ice covered sea areas. If there is a sharp edge of ice, one should enter the ice at a 90° angle with safe speed. One should always look for open water leads or a usable track (ice channel). If there are ice waypoints issued by the icebreakers, one should look for a track or easy ice near the waypoint line.
  - Already before entering the ice, one should start following other traffic, using radar and ECDIS, and the speed of other vessels as an indication of ice conditions and in order to find fresh usable tracks. VHF can be used to exchange ice information with other vessels in the area.

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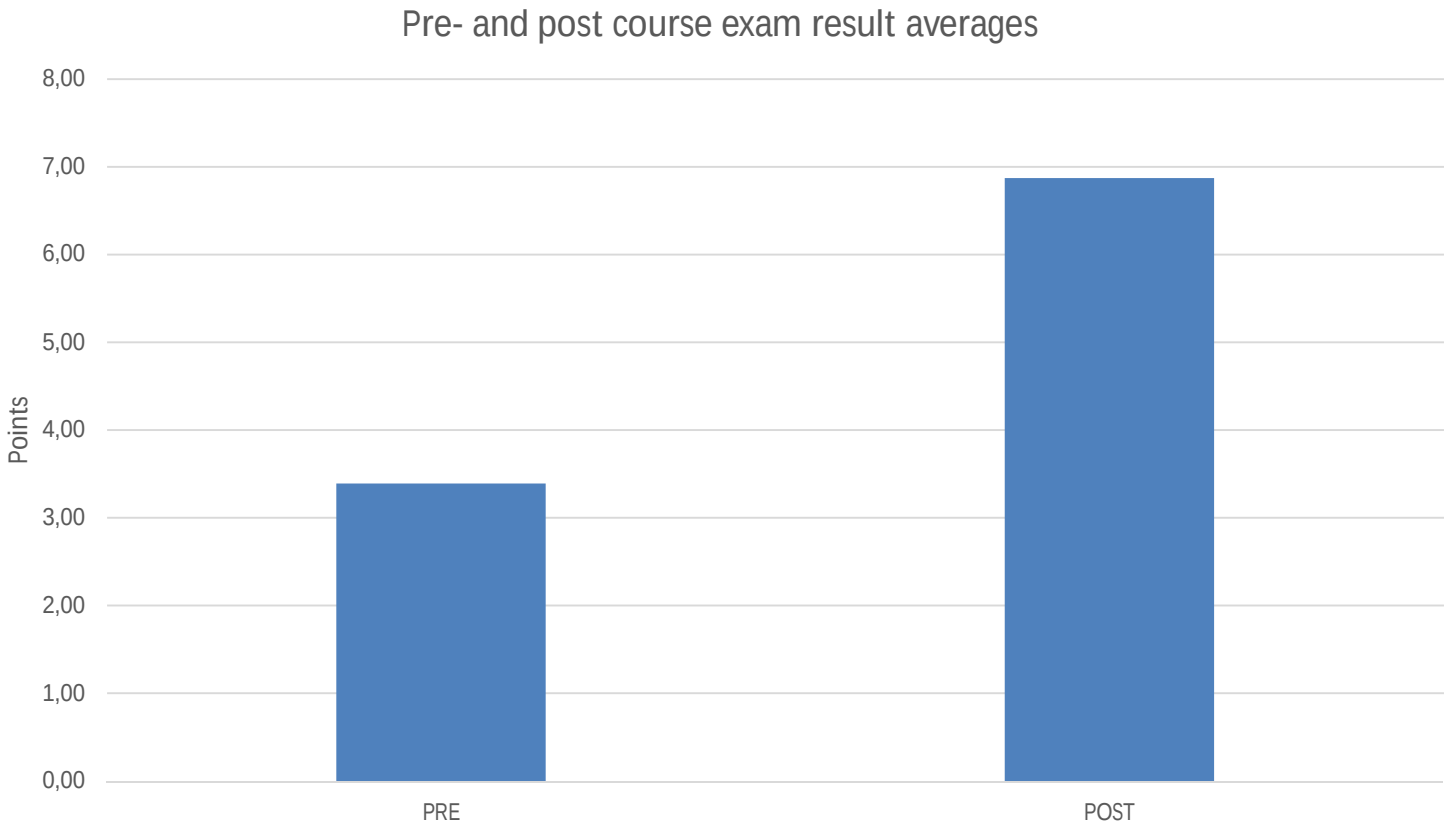
Material tests & evaluation



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Remarks, Usability of the results…

- The developed simulator was not ready for the planned training program
  - Development is continued in a separate project (ASTP) & new applications sent
- The collected material are satisfied by the lecturers
  - Novia is involved in developing of the Model course for the Polar code
- Dissemination level defines the real exploitation…

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Thanks!

Questions?

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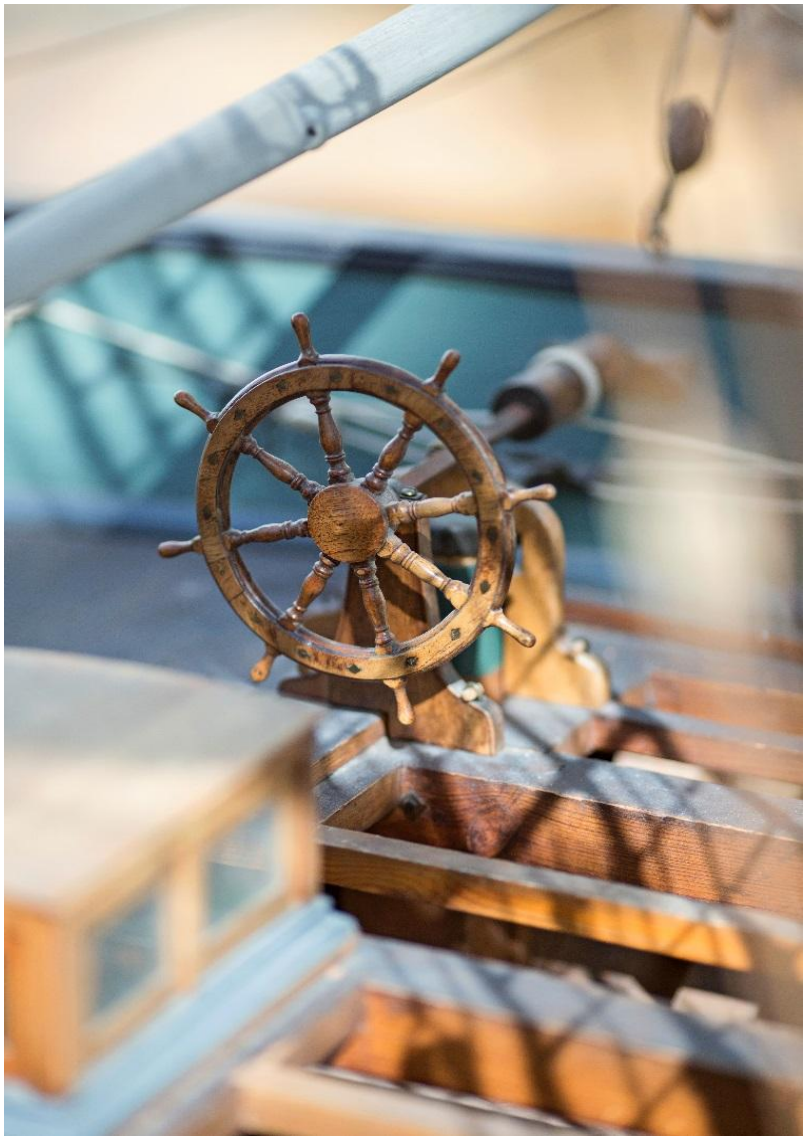

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Image Soft Oy

- Private company, est. 1990
- Headquarters in Helsinki, Finland
- Business focus on:

  Maritime Training Simulators

  Underwater Surveillance Technology

  Integrated to UNITEST Engine Room Simulators for complete maritime exercises
- Certifications: ISO 9001:2008 DNV GL Class A & S
- High investments in R&D and internationalization (Europe, Middle-East, Asia)

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Image Soft maritime simulator solutions

- IS Full Mission Bridge simulator
  Complete training environment for ship handling
- IS Full Mission Bridge simulator for Arctic Operations
  Safe abnormal situation training environment in true-to-life arctic conditions
- IS ECDIS simulator
  For IMO Model course 1.27 training and basic maritime skills
- IS Radar simulator
  Solution for basic radar training
- IS Sonar simulator
  Solution for training scanning, multibeam and side scan sonars
- IS GMDSS communication simulator
  Full solution for Search and Rescue training

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Testing with existing ice-going simulator

List of shortcomings (Q8,Q9)

- new training areas needed
- satellite image of the ice covering the training sea area
- ice database proportional with the satellite image
- ice features to radar image
- freeing the vessel by breaking the surrounding ice
- parking the vessel to ice
- convoy operations
- berthing in ice conditions
- correct control positions when restarting reply

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Testing with existing ice-going simulator

List of shortcoming:

- sounds of ice-breaker
- lights to be used at night time
- tilting the ice-breaker to reduce friction
- towing feature
- new tools for the instructor
- ice spalling and fracture
- ice field movements
- ice compression
- flush with propeller current
- ice support to radar

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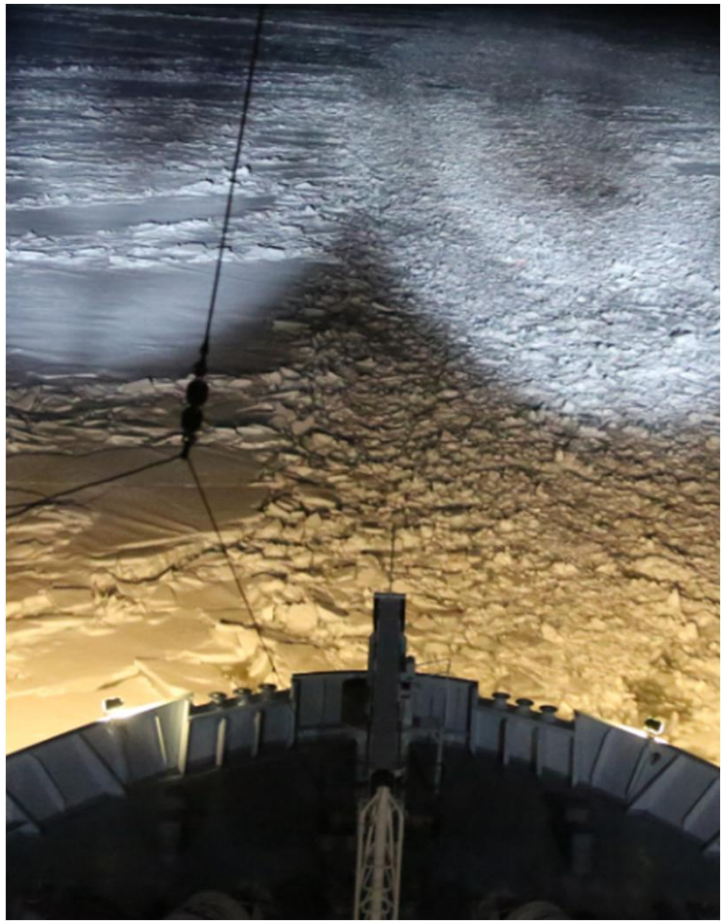
Visit to Otso ice-breaker

Purpose: (Q10)

- Visual material
- Audio recordings
- Radar pictures
- Performance of the Otso

Material was used to develop:

- better winter visual
- sounds of the ice-breaker
- better ice support for radar
- Panel model for the ice-breaker



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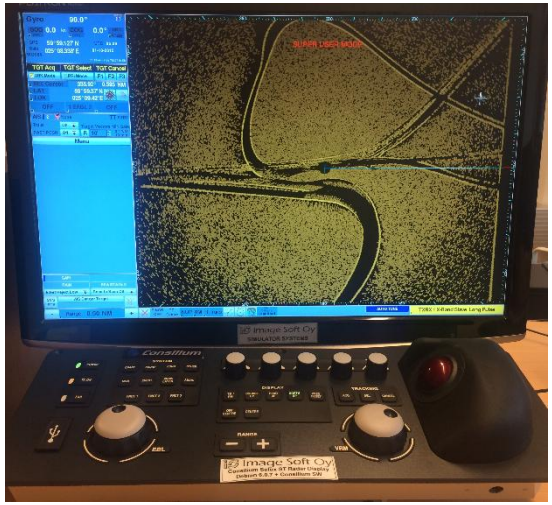
Testing and improvements

Ice-radar testing and improvements (Q11,Q12,Q13,Q14):

- Ice-radar simulator was compared to real radar
- Improvements to increase reality and performance
- Snowing and attenuation
- Interface to real ice-radar user interface (Consilium Selux)



Ice breaking sounds (Q12,Q13):

- Sound improvements based on Otso visit

Spot lights (Q13,Q14)

Panel model testing and improvements (Q15,Q16)

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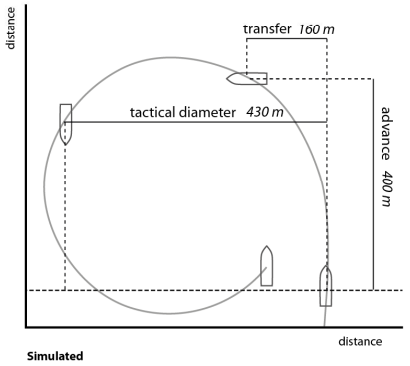
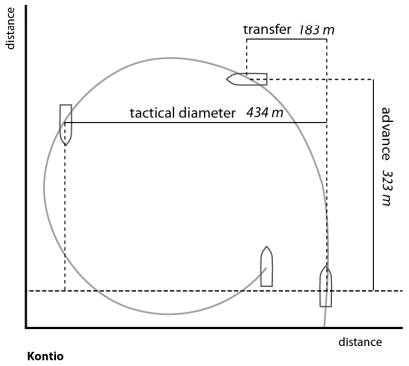
IS Panel Model vs Kontio , Turning Circles

TURNING CIRCLES - Simulated / Kontio

	Simulated	Kontio
Wind dir. [deg]	330	330
Wind speed [m/s]	6	6
Initial heading [deg]	150	150
Rudder angle [deg]	34	34
Turning speed [deg/min]	64	65
Speed [knots]	6.4	7.1
Steady turn diameter [m]	380	362

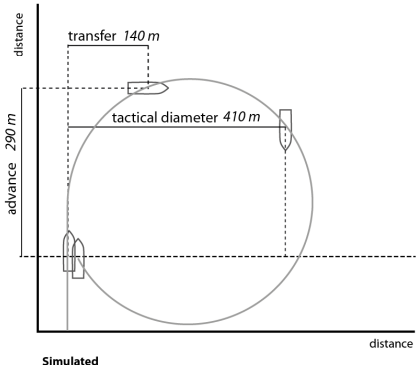


Simulated

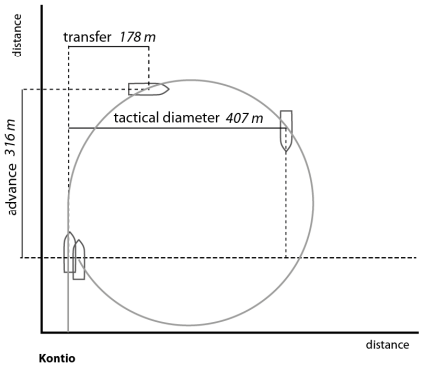


Kontio

	Simulated	Kontio
Wind dir. [deg]	330	330
Wind speed [m/s]	6	6
Initial heading [deg]	335	335
Rudder angle [deg]	33	33
Turning speed [deg/min]	65	65
Speed [knots]	6.9	7.1
Steady turn diameter [m]	420	414



Simulated



Kontio

IMAGE SOFT
Maritime simulators for certified training

http://imagesoft.fi/isdata/video/ImageSoft-ArcticSimu.mp4