KONGSBERG

Scope of Work

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K-Sim Navigation Models for Sea farms

Fagskolen i Hordaland

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1 INTRODUCTION

K-Sim® Navigation – Sea Farms models

K-Sim® Navigation is designed for the future of advanced and integrated ships bridge simulation training. It is based on a cutting-edge technology platform enabling more realistic training scenarios and enhanced user benefits for both instructors and students

Realism

An advanced new physical engine and state-of-the-art hydrodynamic modelling allow vessels, objects and equipment to behave and interact as in real life. Vessels and objects including various geographical training areas and all possible weather conditions are brought to life with a sophisticated new visual system.

1.1 K-Sim Sea Farm models

New Hydrodynamic Model "Catamaran Work Boat" and "Live-hauling Boat" made according to Model data Request form with a new operating crane model and special deck equipment as with this ship model.

1.2 K-Sim Marine Deck Crane Simulator

The Marine Deck Crane simulator is made with functionality according to maritime crane requirements.

1.3 Crane Models

- Maritime Crane 48t (foldable knuckle boom cranes)

The operator controls can control fordable telescopic knuckle boom cranes with winch.

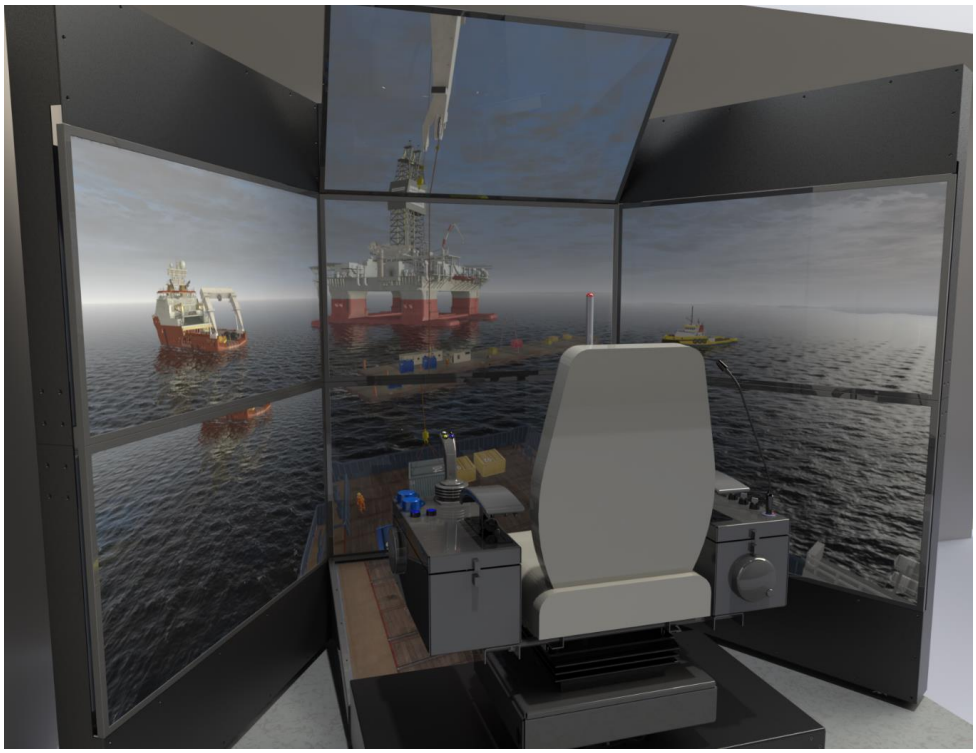
The following functionality are part of the control system

- Slew Left/Right joystick
- Boom Up/Down joystick
- Jib Extract/Retract joystick
- Telescope In/Out joystick
- Hoist Haul-in/Pay-out joystick
- Controls enable switch
- Emergency Stop button
- Overload alarm indicator

The crane control system has automatic functionality for auto run of winch when telescoping to maintain hook position and safety functions for hookstop with upper limit indicator, hoist lower limit switch and crane overload protection detection.

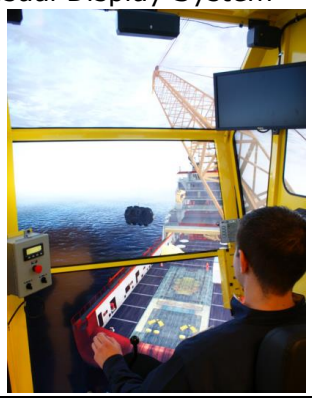
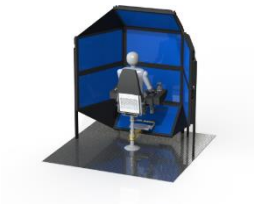
1.4 Potential advanced options:

1.4.1 Crane Hardware Configuration



Crane Cubicle exluding motion

1.4.2 Advanced Crane Work Station

Item	Description	Qty
Crane Operator Chair/Crane controls 	Crane chair with rotating base and armrest consoles with crane controls and touch monitor. Stereo environment sound system embedded	Option
Visual Display System 	Including • 8x SeaView R6 Visual channels • 8x Flat screen displays • Metal frame construction, for mounting of visual displays  Covering about 180degree horizontal and 150degree Vertical	Option

1.5 Instructor System

Figure 1 Instructor Concept

K-Sim Navigation Instructor system offered includes a standard setup comprising of dual instructor screens, and a large screen for visual "drone-view" function. The communication to bridges is controlled using a screen based interface. The instructor can control several bridges in a joint operation scenario or as separate bridge modes, where each bridge executes it's on exercises. A printer is included for print out of scenario plots, screen shots, and simulator parameters if required.

2 NEW K-SIM MODELS FOR SEA FARMS

2.1 New Model "Catamaran Work Boat"

Alternative	Description	Price in: NOK
1	New Hydrodynamic Model "Catamaran Work Boat" made according to Model data Request form but without new operating crane model and special deck equipment as with this ship model. Level of performance: Standard modelling of supply vessel for training within manoeuvring, navigation, towing, standard anchor handling operations, and winch operations with generic equipment on aft deck. Ships data such as GA-Drawing, ship specification, trial data, colour information, pictures and other relevant data about the new model, to be supplied to KDI before the delivery can start. Note: Missing data not supplied at this time or at request must be estimated by KM at their best guess and may affect the realism of the model.  Development of new crane is quoted as option.	**290.000,-**

Alternative	Description	Price in: NOK
2	**Maritime Crane 48t (foldable knuckle boom cranes)** The operator controls can control fordable telescopic knuckle boom cranes with winch. The following functionality are part of the control system • Slew Left/Right joystick • Boom Up/Down joystick • Jib Extract/Retract joystick • Telescope In/Out joystick • Hoist Haul-in/Pay-out joystick • Controls enable switch • Emergency Stop button • Overload alarm indicator The crane control system has automatic functionality for auto run of winch when telescoping to maintain hook position and safety functions for hookstop with upper limit indicator, hoist lower limit switch and crane overload protection detection.  **Optional and not included:** Student control of the crane - either with software leavers or hardware controls - to be specified upon request.	**650.000,-**

Alternative	Description	Price in: NOK
3	**New Model Customer specific "Live-hauling boat"**  New Hydrodynamic Model "Live-hauling Boat" made according to Model Data Request Form. **Level of performance:** Standard modelling of supply vessel for training within manoeuvring, navigation, towing and winch operations with generic equipment on deck. Including Wessel specific K-Pos DP Development of crane can be delivered as an option.	**650.000,-**

3 ADMINISTRATIVE ITEMS

3.1 Documentation

All Kongsberg Digital documentation, where applicable, will be delivered in Adobe® Acrobat® PDF- format. All system manuals will be written in English.

Note: Manuals supplied with other subcontracted equipment, such as third-party Radar/ARPA systems, receivers, printers, projection equipment etc., shall be supplied in the quantities received from the manufacturer.

3.2 Project Management

When the contract is signed, Kongsberg Digital will assign a Project Manager who will be responsible for administration and day-to-day communication with the customer up until delivery and installation of the system specified in the quotation. Unless otherwise specified, Project meetings held outside KDI's premises will be charged according to cost.

Project management is based on Kongsberg Digital standard PM procedures. Other standards will be charged according to time and material.

3.3 Quality Assurance and Quality Control

Quality Assurance and Quality Control are included.
The KDI project manager is responsible for preparing an internal test procedure in accordance with the KDI Quality Assurance program. The test will be made according to the test procedure and the equipment will be shipped after successful completion of the test.

3.4 Factory Acceptance Test (FAT)

The KDI project manager is responsible for preparing an FAT procedure in accordance with the KDI Quality Assurance program. The test will be made according to the test procedure and the equipment will be shipped after successful completion of the test.

3.5 Site Acceptance Test (SAT)

The KDI project manager is responsible for preparing an SAT procedure in accordance with the KDI Quality Assurance program. Following a completed installation, a system acceptance test (SAT) will be conducted. A customer representative authorized to sign the SAT certificate shall be present during the entire SAT.

3.6 Installation and Start-up

The installation of the simulator equipment will be conducted by a Kongsberg Digital experienced installation engineer. System start-up will take place immediately after the installation and commissioning period. At the end of the start-up period, a Site Acceptance Test of the system will take place. The installation and commissioning includes basic instructions, installation material appropriate for setting the simulator to work including plugs, cables and miscellaneous installation material.

3.7 Facility Requirements

Local Area Network, Voltage, Air-condition, humidity, temperatures, etc. are stated in document "423310 Facility Requirements.pdf" and are mandatory requirements for the customer.

3.7.1 VAC Supply / Building

The customer is required to provide the following support and infrastructure under local or national building code as follows:

- Power outlets with ground system. Voltage 220V AC ±15V AC RMS Single phase or 110V AC ±10V AC RMS Single phase. Frequency 50 Hz or 60 Hz ±0.5 Hz
- Customer to arrange internet connection with fixed public IP address. This will allow remote diagnostic. If the site does not have access to Internet "Broad band" KM will supply Telephone Modem.
- Illumination in all areas containing simulator equipment and all access ways has proper working illumination.
- Construction work in the simulator.
- Paint work in the simulator facility. For color suggestions please contact the project manager.
- Cleaning - the simulator facility is properly cleaned and tidy, and that all access ways are free from stored equipment.
- Temperature control equipment servicing the simulator facility within limits.
- Door access - door widths and access ways to the simulator are in accordance with specification, so that it is possible to bring in the various components of the simulator.
- Building access to allow the simulator equipment to be brought into the building.
- Safety - fire-extinguishing equipment are in place and escape ways are not blocked according to local building codes.

3.8 Environmental Requirements

Temperature

When turned on:

Ideal temperature:	22 ± 3°C (72 ± 5°F)
Minimum temperature:	10°C (50°F)
Maximum temperature:	30°C (86°F)
Maximum temperature gradient:	5°C (9°F) per hour

When turned off:

Minimum temperature:	0°C (32°F)
Maximum temperature:	50°C (122°F

Humidity

When turned on:

Ideal relative humidity:	50% ± 10%
Minimum relative humidity:	30%
Maximum relative humidity:	95% no condensation

When turned off:

Minimum relative humidity:	5%
Maximum relative humidity	95% no condensation

Note that if the humidity is lower than 30%, there may be problems with static electricity.

3.9 Option K-Sim Offshore Crane

Item	Description	Price in: NOK
6.3.1	Optional Crane Cabin for motion system  Including Heavy duty metal frame cabin, designed for motion platform	Price at request
6.3.2	Optional Motion Cue System  6 DOF Motion system A motion base can be delivered upon request	Price at request

4 General Terms and Conditions

4.1 Expenses Excluded in Sales Price

The sales price is exclusive of possible import duties, taxes, any withholding tax and VAT.

4.2 Payment Terms

Proposed payment terms are:
-40% of the Contract Price shall be paid at Contact Signature.
-30% of the Contract Price shall be paid at shipment.
-30% of the Contract Price shall be paid no later than 30 days after taking-over.

Kongsberg is prepared to discuss alternative solutions

4.3 Time of Delivery

The equipment will be delivered to: Fagskolen i Hordaland 3-6 months after signed contract.

4.4 Terms of Delivery

According to INCOTERMS 2010: CIP/DAP Fagskolen i Hordaland.

4.5 Validity of Quotation

This quotation is valid until: 90 days after the date of this document.

4.6 Equipment Warranty

Kongsberg Digital AS warrants for a period of 12 months from the date of shipment according to Kongsberg Digital's standard terms for warranty.

4.7 Product Recycling

Please check our website http://www.km.kongsberg.com and then "SUPPORT" and "Product Recycling" for more information.

4.8 Other Terms and Conditions

Please refer to attached PDF-document:
609407/2 "Standard_Cond_S&I_of_SW_and_HW Logo.pdf".