# SCOPE OF WORK DESCRIPTION FASTRUNNING CARRIAGE SMB K665-03

## OSC-30-H004-M-SP-00029

## 1107305 OCEAN SPACE CENTRE

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# PROJECT OCEAN SPACE CENTRE

# SCOPE OF WORK DESCRIPTION FASTRUNNING CARRIAGE SMB

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# 1 Table of Content

# 1 Introduction

## 1.1 Objective

The purpose of this document is to define the Scope of Work for the manufacturing, delivery, installation, and commissioning of a new fastrunning carriage for the Seakeeping and Manoeuvring Basin at the hydrotechnical laboratories at Tyholt, Trondheim.

The fastrunning carriage shall be delivered mechanically completed and ready for operation, with rails, structures, bogies, drive engines, electrical power transmission and connection to power supply, cabling, automation and control systems and cabinets.

## 1.2 Description of Delivery

The Seakeeping and Manoeuvring Basin (180 x 40 m) shall be equipped with a secondary fastrunning carriage that shall supplement the main, larger towing carriage of the facility. The fastrunning carriage shall be used primarily for towing and free-running propulsion testing of smaller high-speed models both in calm water and in waves. The fastrunning carriage will also be used for open water testing of propellers, thrusters, foils and turbines. More unconventional tests will also be conducted on this carriage.

The fastrunning carriage shall supply power, data, and towing action to high-speed model tests on as long a stretch as possible along the seakeeping and maneuvering basin. It is desirable to start the acceleration phase of models inside the trim dock to utilize the length of the basin. The carriage system must ensure flexible and easy mounting and configuration of models and sub modules. Furthermore, mounting of video cameras, wave probes and optical position measurement systems must be supported. The fastrunning carriage shall be unmanned and remote controlled.

Most tests are performed according to the guidelines and procedures of International Towing Tank Conference (ITTC). Latest guidelines and procedures can be found on www.ittc.info.

## 1.3 Definitions and abbreviations

**Definitions:**

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| Company: | Statsbygg, which is the Norwegian government's key advisor in construction and property affairs, building commissioner, property manager and property developer. |
| Purchaser: | Company |
| Contractor: | The party named as such in the Form of Agreement |
| Subcontractor: | Third Party who has entered into an agreement with the Contractor for the supply of goods or services in connection with the Work. |
| EPC K202 | EPC Contractor responsible for demolition works, ground works for building B and shortening of existing towing tank. |
| End-user: | Sintef Ocean and NTNU |

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| Plant: | The machinery, apparatus, materials, articles, documentation, software and other products to be supplied by the Contractor under the Contract. |
| Works: | The plant, installation of the plant and any other work to be carried out by the Contractor under the contract. |
| Company Materials: | Equipment, systems, and/or materials supplied by Company and which are to be incorporated in the Contract Object. |
| EPC K203 | Building B construction contractor |

**Abbreviations:**

DFO - Documentation for Operation
HLCC - Hydro Laboratory Centralized Control
MC - Mechanical completion
MDP - Master Document Plan
NS - Norwegian Standard
OB - Ocean Basin
OSC - Ocean Space Centre
SMB - Seakeeping and Manoeuvring Basin
EPC - Engineering, Procurement and Construction

# 2 The Works

The Works consists of the following main elements:

a) Participation in Joint Collaboration Phase (reimbursable engineering hours)
b) Detail design, engineering, manufacturing, assembly, delivery
c) Documentation
d) On-site supervision and Installation work
e) Mechanical completion and Commissioning work
f) On-site system acceptance test
g) Training Courses

The fastrunning carriage shall fulfil the requirements described herein and in the following documents:

- OSC-30-H004-M-SP-00028 Requirements - Fastrunning Carriage SMB
- OSC-30-H004-S-SP-00001 Requirements for Automation Control – and Safety Systems
- OSC-30-H004-Z-RA-00004 Material selection report
- OSC-30-H004-Z-RA-00002 Requirements for Corrosion Protective Coatings
- OSC-80-SB -O-SD-00001 Requirements for supplier documentation including DFO
- OSC-80-SB-O-SD-00008 Strategy for Systematic Completion of BUT
- OSC-80-SB-O-DB-00001 Technical Design Basis

- OSC-80-SB-O-SD-00003 Tagging requirements
- OSC-30-SB-Y-SP-00003 Special requirements for HSWE and seriousness

## 2.1 Participation in Joint Collaboration Phase (JCP)

Contractor shall participate in a joint collaboration phase together with the EPC contractor for construction of building B (EPC K203) of the Ocean Space Centre Project. The JCP will be headed by Company. The End User will also be involved in the JCP.

The main purpose of the joint collaboration phase is to implement all requirements of the user equipment for the hydrodynamic laboratories into the design and construction of building B. The purpose is also to investigate and resolve performance issues related to interaction between other equipment systems and to clarify interfaces to End User control systems. JCP will also include final review of the project's overall logistics plan and delivery schedule. Contractor shall also expect adjustments including value engineering of user equipment design and functionality as a result of the collaboration. Such adjustments shall be listed and be the basis for determination of fixed final Contract price.

During the collaboration phase, all interfaces between each user equipment supplier and EPC K203 shall be identified and agreed. Interface agreements shall be established.

Participation in the JCP will be on a reimbursable basis. As a guidance, Contractor shall anticipate the following:

- JCP duration in total: 50 weeks. Expected to be started in January/February 2023
- Contractor participation period in the JCP: 36 weeks
- Expected Contractor manpower load: Two persons, two days a week
- Main collaboration tool: Teams-meetings, and occasionally physical meeting in Trondheim or Oslo. Exchange of design documentation.

## 2.2 Detail design, engineering, manufacturing, assembly and delivery

The engineering, manufacturing, assembly and delivery comprise of such items as:

- Provision of own organisation including head office support services, administration and a project organisation to manage and control the execution of the Work including complying with all requirements of document OSC-80-SB-Q-SD-00001 Administrative Procedures.
- Provision, maintenance, operation and demobilisation of all required facilities to complete the design and engineering, manufacturing, assembly and delivery.
- Contractor's system engineering and fabrication engineering
- Provision of materials for fabrication, manufacturing and assembly
- Fabrication, manufacturing, assembly of the complete fastrunning carriage system, rails system, power transmission and electrical drives/control cabinets
- Programming
- Inhouse testing including witness tests
- Documentation of own equipment and functions

- Miscellaneous

Contractor shall perform the system engineering, fabrication engineering, design and documentation required for the manufacturing, fabrication, assembly, and completion of the Works. Contractor shall also produce all documentation required for the civil interfaces and interfaces to technical systems. Contractor's engineering shall include such items as:

- System documentation and calculations for fastrunning carriage system
- Exchange of engineering data
- Engineering documentation
- Coordination of subcontractors and sub suppliers
- Tag numbering
- Identify necessary civil works, or any works by others required for the carriage system

Contractor shall in good time provide drawings and descriptions showing the manner in which the Plant is to be installed, together with all information required for preparing suitable foundations, for providing access for the Plant and any necessary equipment to the Site and for making all necessary connections to the Works. Contractor shall specify in detail requirements regarding electrical supply and communication network interfaces.

Equipment and main components shall be tagged according to requirements described in document OSC-80-SB-O-SD-00003, Tagging Requirements.

Inhouse testing including witness testing shall include Factory Acceptance Test (FAT) of assembled equipment, units and systems. Contractor shall prepare suitable test procedures for performance of the FAT. FAT shall contain a complete test of as many functions and signals as practical possible according to OSC-80-SB-O-SD-00008 Strategy for Systematic Completion of BUT.

## 2.3 Documentation

Contractor shall provide all engineering and manufacturing documentation, including documentation provided by subcontractors, that are necessary to complete the Work in accordance with the requirements prescribed below:

- OSC-80-SB-O-SD-00001, Requirements for supplier documentation including DFO
- OSC-80-SB-Å-SD-00002, BIM requirements for special equipment
- OSC-80-SB-Å-SD-00003 SIMBA 2.0 General requirements
- OSC-SB-O-SD-00012, Action plan for digitalization
- OSC-80-SB-Å-SD-00001, General attributes and properties in BIM models

The DFO shall be delivered in English and Norwegian language. The DFO shall enable the End-user to operate, calibrate, and maintain the Plant throughout its intended lifetime. The DFO shall specify in detail all maintenance activities necessary to be performed in order to fulfil the guarantee requirements.

## 2.4 Logistics and Transportation

The SMB Fastrunning Carriage system shall be fabricated in suitable modules/elements that can be transported into the basin for assembly and further installation. The Contractor is responsible for transportation and shall perform transportation to the construction site.

The details of the optimisation of transportation, logistics and installation is to be shown in a separate schedule for size of objects, travel distances, installation needs etc.

## 2.5 On-site supervision and Installation work

Contractor shall perform desktop review of steel reinforcement documentation prior to casting to ensure clashes between support bracket bolts and the reinforcement steel. Relevant documentation will be provided by Company in due time prior to casting.

Contractor shall perform installation of the complete fastrunning carriage system, including rails, power transmission, emergency stop system and cabinets. Before the Work starts, Contractor shall ensure that the installation site including foundations are ready for start of the installation work.

The installation work to be performed by Contractor will include the following main activities:

- Verification of construction tolerances of foundations
- Installation of specified equipment (complete fastrunning carriage system including rails, power transmission and cabinets).

Necessary cranes, lifting equipment and equipment for transport on the Site will be provided by Company.

Company will provide the following:

Cable supports, cabling and termination of electrical supply to the electrical drive control panel(s) from existing electrical local distribution board.

## 2.6 Mechanical completion and Commissioning work

Contractor shall perform mechanical completion activities and commissioning work according to the following requirements:

- OSC-80-SB-O-SD-00008, Strategy for Systematic Completion of BUT

All mechanical completion and commissioning activities shall be documented in Omega365.

The original Systematic Completion documentation shall be filed by Contractor. All documentation, which also shall include systematic completion documentation for Subcontractors, shall be compiled in systematic completion dossiers, kept in good order, continuously updated in Omega365 and available for Company before the activity take place. All works, inspections and tests shall be completed, and all punch items shall be identified and registered in Omega365. Any transfer of A-punch items at a phase transition must be approved by Company.

Contractor shall perform all commissioning of the Contract Object, including the provision of procedures, special tools, commissioning spares etc.

## 2.7 On-site system acceptance test

Based on input from end-user, Contractor shall prepare acceptance criteria for the fastrunning carriage.

Contractor shall prepare a detailed on-site acceptance test procedure, as well as a test schedule. The on-site acceptance test procedure shall be submitted to Company for approval.

Contractor shall perform the on-site acceptance test including interface to end-user’s HLCC system. The on-site acceptance test shall be witnessed by representatives from Company and end-user.

Contractor shall specify in writing his requirements concerning performance of the on-site acceptance test including any assistance needed at the latest one month prior to agreed date for starting the acceptance test.

## 2.8 Training Courses

Contractor shall provide professional training of end-user operators and service/maintenance personnel. Each type of course shall be described, including required equipment and facilities. Training documentation shall be presented latest 4 weeks prior to the training courses will take place. Training shall be held in Norwegian or English language.

# 3 References

- OSC-30-H004-M-SP-00028 Requirements - Fastrunning Carriage SMB
- OSC-30-H004-T-RA-00001 Requirements for Automation Control – and Safety System
- B-01-M-665-60-001 System diagram Fastrunning Carriage SMB
- B-01-S-56-60-002 System diagram Automation control and safety system SMB
- OSC-30-H004-Z-RA-00002 Requirements for Corrosion Protective Coatings
- OSC-30-H004-Z-RA-00004 Material selection report
- OSC-80-SB -O-SD-00001 Requirements for supplier documentation including DFO
- OSC-80-SB-O-SD-00008 Strategy for Systematic Completion of BUT
- OSC-80-SB-O-SD-00003 Tagging requirements
- OSC-80-SB-O-SD-00002 TFM-Amendment TFM-tagging of User Equipment
- OSC-30-H004-M-SP-00027 Equipment list from dRofus - Fastrunning Carriage SMB
- OSC-30-SB-O-SD-00002 Interface description
- OSC-80-SB-Q-SD-00001 Administrative Procedures
- OSC-30-SBY-MA-00005 Statsbygg OSC HSWE Plan
- OSC-30-SB-Y-SP-00003 Special requirements for HSWE and seriousness
- OSC-80-SB-Å-SD-00002 BIM requirements for special equipment
- OSC-80-SB-Å-SD-00003 SIMBA 2.0 General requirements
- OSC-SB-O-SD-00012 Digitalization Action Plan
- OSC-80-SB-Å-SD-00001 General Attributes and properties in BIM models
- OSC-30-SB-O-PL-00001 Project overall progress plan
- OSC-30-SB-O-SD-00008 B5 Grensesnittsbeskrivelse K203 / Interface description K203
- OSC-30-SB-O-SD-00004 B6 Grensesnittsmatrise K203 / Interface matrix K203
- OSC-80-SB-Q-SD-00004 Quality Plan