SCOPE OF WORK DESCRIPTION
CARRIAGE SMB
K665-01

OSC-30-H004-M-SP-00021

1107305 OCEAN SPACE CENTRE

Project	Ocean Space Centre
Contract	K665-01
Company	Statsbygg
Issued by	Multiconsult
Date of print	16.09.2022
Last revision	16.09.2022
Enquiries can be directed to	Statsbygg
	Postboks 232 Sentrum, 0103 Oslo
	Telefon: 22 95 40 00
	Epost: postmottak@statsbygg.no
	Internett: http://www.statsbygg.no

PROJECT OCEAN SPACE CENTRE

SCOPE OF WORK DESCRIPTION CARRIAGE SMB

02	16.09.2022	Issued for enquiry	BJT	HS	OJH
01	09.07.2022	Issued for review	BJT	HS	OJH
Version	Date	Text	Prep by	Checked by	Approved by

Project number:	Issued by:	Project name	Code:	Document type:	Document code:	Version:
1107305	**SB**	**Ocean Space Centre**	**O**	**Governing document**	**OSC-30-H004-M-SP-00021**	**02**

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 carriage for the Seakeeping and Manoeuvring Basin at the hydrotechnical laboratories at Tyholt, Trondheim.

The 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 carriage system that shall cover a large range of functionalities – traditional towing tank configurations (resistance, propulsion, open water tests, etc.), seakeeping tests and maneuver tests, but also prescribed motion tests in a hexapod, station-keeping tests and testing of moored installations, both above and below water surface. The facility will also be used for testing other types of objects.

The facility will accommodate numerous experimental setups. The carriage should be designed with flexibility to support multiple different submodules, allowing for installation of new equipment or test rigs throughout its lifetime. The carriage shall further provide good working conditions for on-board personnel and allow for easy access to test objects in their experimental setup. Furthermore, the carriage shall support a good client experience, providing access for viewing on-going model tests closely.

The contractor shall propose a carriage system that shall satisfy both quantifiable requirements such as speeds, stiffness, natural frequency etc. as well as qualitative requirements such as access to models, spectator facilities and operational considerations.

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:

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

- OSC-30-H004-M-SP-00020 Requirements - Carriage SMB
- OSC-30-H004-S-SP-00001 Requirements for Automation Control – and Safety Systems – User equipment
- 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 carriage system including the working and spectator platforms, 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 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
- 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 Carriage system shall be fabricated in suitable sections 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 no 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 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 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 SMB 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 on-site 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-00020	OSC-30-H004-M-SP-00020 - Requirements - Carriage SMB
• OSC-30-H004-T-RA-00001	Requirements for Automation Control – and Safety System
• B-01-M-665-60-002	System diagram - 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-00019	Equipment list from dRofus - 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