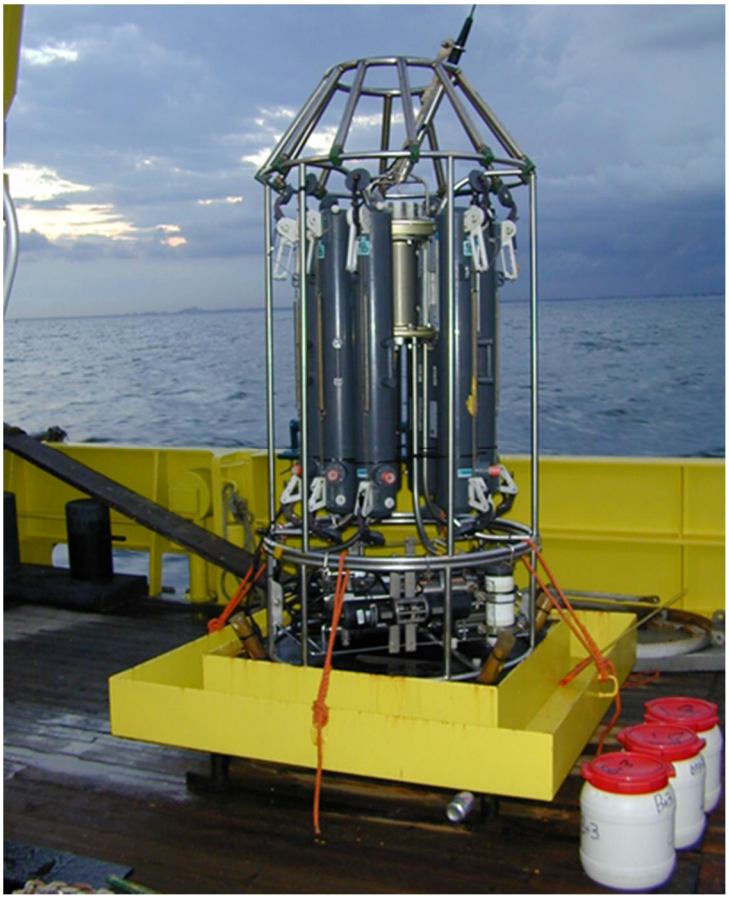
Market consultation document

for

water-quality instruments



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Contents

1. Introduction

1.1 About Rijkswaterstaat

Rijkswaterstaat (the Directorate General for Public Works and Water Management) is the implementing organisation that works on behalf of the Ministry and Secretary of State for Infrastructure and the Environment towards the rapid and safe flow of traffic, a safe, clean and user-friendly national water system and protecting our country against the risks of flooding. With that in mind, Rijkswaterstaat manages the main road network (5,695 km), the national waterways network (1,686 km of canals, rivers and 6,165 km of navigation channels in open water) and the national water system (65,250 km2).

The Central Information Services (CIV) service of Rijkswaterstaat (RWS-CIV) is one of the national organisation units of RWS. RWS-CIV is responsible for collecting, managing and distributing data, as well as ICT management and development. The website www.rijkswaterstaat.nl provides more information about Rijkswaterstaat and RWS-CIV.

1.2 Background

For the implementation of its tasks, Rijkswaterstaat requires information about the quality of the water. Rijkswaterstaat uses this information for various purposes including compliance with framework directives, international guidelines and directives, determining the ecological quality of water systems, internal decisions on water management, determining the quality of swimming water, salt intrusion and for its enforcement tasks.

On behalf of RWS, RWS-CIV is responsible for obtaining the necessary information. That information can be purchased or obtained by the organisation itself and can be determined in a number of different ways (in-situ measurement, sampling, remote sensing, etc.). The scope of this document relates to the internal collection of data by RWS using physical, in-situ sensors. These measurements are carried out:

- on board RWS survey vessels;
- via manual measurements;
- from a number of measuring pontoons used for monitoring water quality.

All water-quality sensors that make up the permanent measuring network (LMW) are beyond the scope of this market consultation.

Corporate Instrument Stock (Corporate Instrumentenbestand - CIB) manages the instruments required for these measurements and lends them to the users. The users themselves are responsible for managing the measuring installation at the measurement location/on board. The aim is, as far as possible, to select uniform instrument types suitable for multiple applications and users. The reasons for this decision are to minimise the required spare parts stocks, to ensure efficient deployment, the efficient acquisition of knowledge and interchangeability in use, and to ensure effective purchasing processes.

A number of the existing water-quality instruments are soon due to reach the end of their useful life and/or support period. The purpose of this market consultation is to prepare for the proposed tendering procedure for water-quality sensors. Rijkswaterstaat attaches considerable value to the opinions of market parties and aims to actively involve them at the earliest possible stage before the proposed tendering procedure is initiated.

RWS-CIV hereby invites market parties to participate in this market consultation.

1.3 Purpose of the market consultation

RWS-CIV has published this market consultation document on TenderNed with the aim of reaching out to, and attracting the interest of as many market parties as possible and encouraging them to contribute their thoughts.

By launching this market consultation, RWS-CIV aims to:

a) gather input for the tendering strategy and the tendering documents (generating new ideas, assessing existing ideas);
b) involve the market in the project at an early stage, to ensure that the tendering documents are matched as closely as possible to the market situation;
c) gain an insight into the number and quality of potential tendering parties.

The market consultation has identified four key questions:

- Which of the requested areas of application can you supply?
- What additional services can you offer to relieve the burdens on RWS-CIV?
- What is your view of the proposed breakdown into lots?
- What is the most efficient possible structure for contract management?

RWS wishes to emphasise that this market consultation is not part of the tendering procedure and that no rights may be derived from this document.
Any insights gained from the market consultation will be used by RWS (wherever relevant) in preparing the tendering procedure and the tendering documents. RWS reserves the right to not (fully) make use of these insights.

2 Determining the scope

2.1 Underlying principles

The primary underlying principle is to ensure the availability and quality of the required sensors for a period of at least 10 years. The use of Commercial off-the-Shelf (COTS) products is the preferred option.

In addition, in its market approach, RWS-CIV wishes to outsource as large a proportion of all activities relating to the management of the instruments as possible. RWS wishes to minimise its own technical, logistical and administrative tasks by establishing one or more contracts involving the minimum possible operational controls and exchanges. The instruments are and/or will be the property of RWS.

2.2 General description of requirements

Requirements at least include:

a. Initial supply of instruments and spare parts
b. Continued supply of parts and spare parts
c. Service for preventive and corrective maintenance
d. User support

RWS also requires the following services:

e. Collection, preparation for use and issue of systems
f. Service counter function for users
g. System storage
h. System transport
i. Records of stocks and periodic reporting

Annex 2 Service description contains a description of the services over and above the initial supply of instruments and supply of spare parts (requirements referred to in a and b). The services referred to in c and d are minimum requirements. In addition, RWS-CIV also needs to outsource the services described in e through to I to the contractor.

The technical scope relates to the instruments and the accompanying peripheral equipment. Any relevant frames, water samplers, lifting equipment and data acquisition computers are beyond the scope. The precise description of the measurement applications including the technical scope appears in Annex 1 Measurement applications and Annex 3 Application table.

The instruments will be deployed for a variety of applications. Given the different requirements that apply for these applications, a series of different instrument types and systems will have to be supplied. On the basis of an initial estimate of the possibilities offered by the market, and the wish to provide the clearest possible contract landscape, the scope has been divided into two lots, namely:

1. North Sea - for applications A and B. This includes requirements b through to i. Requirement a is not included because the end of the technical service life of the current instruments has not yet been reached.
2. Inland Waterways - for applications C through to I.

Within these lots, various instrument types may be offered in order to fulfil all applications. It should be noted that RWS-CIV recognises the added value of the standardisation of instrument types. In all cases, the clear wish is that the offered instrument types must remain unchanged throughout the contract period, for a number of reasons including interchangeability in the event of maintenance.

2.3 Quality and administrative processing

The aim of RWS-CIV is to ensure the efficient management of the agreed performances and to minimise the administrative burdens for both parties. To make this possible, RWS-CIV is interested in the possibilities offered by and the wishes of the market parties. One key operating principle is that RWS wishes to transfer responsibility for demonstrating the (quality of) their performance to the contractors. Among other things, this can mean the following:

- The contractor will operate subject to quality assurance. Communication between RWS and the contractor and the assessment of contract performance by RWS will be focused mainly on the process of cooperation and the underlying quality system, and less on the individual products and reporting on those products. It will be the task of the contractor to propose ways of demonstrating the quality of the services provided.

- The issuing of the contract for the services (not for the delivery of systems) and by extension the invoicing method should generate the least possible administrative burdens for both parties. In the current situation, separate invoices with performance status are sometimes required for each individual service. This represents a severe administrative burden for relatively small amounts. RWS-CIV would for example be in favour of annual charges for maintenance and support, which could if possible be made dependent on the number of instruments in ownership or in active use. RWS-CIV would prefer to bring to an end the practice of separate billing for individual maintenance inspections.

3. Process of market consultation

3.1 Procedure
The procedure for this market consultation is as follows:

1) The market consultation will be launched with the publication of this document, including the questions from RWS-CIV on TenderNed.

2) Any interested market party that considers itself able to contribute to the market consultation is requested to reply to the questions in this market consultation. The replies should be submitted by e-mail to inkoopcentrum-iv@rws.nl before the closing date and time referred to in paragraph 3.2.

3) On the basis of the submitted reactions, RWS-CIV retains the option to invite parties to give face-to-face verbal additional explanations to their answers. RWS-CIV will contact these parties and in consultation plan a meeting during the period referred to in paragraph 3.2.

3.2 Planning
RWS-CIV will operate the following planning timetable:

Activity	Date and time
Publication of market consultation document Dutch version	25 April 2017
Publication of English translation of market consultation document	4 May 2017
Closing date for submitting questions about the market consultation document	18 May 2017 12:00 hours
Publication of answers to questions about the market consultation document.	24 May 2017
Closing date for submitting completed questionnaire	1 June 17:00 hours
Dates for additional interviews	12 through to 30 June 2017

Interested parties may derive no rights from the planning timetable above. RWS-CIV reserves the right to alter the planning timetable. This planning timetable is therefore indicative. The greatest possible effort will be made to comply with the planning timetable.

3.3 Questions about the market consultation document
Market parties will have the opportunity to ask questions about unclear formulations in the market consultation document, with a view to ensuring transparent and clear communication. If parties have questions about the market consultation document, these may be submitted by e-mail to: inkoopcentrum-iv@rws.nl, before the "Closing date for submitting questions about the market consultation document" referred to in paragraph 3.2. The (anonymised) questions from market parties will be answered by RWS in a Memorandum to be published on TenderNed.

3.4 Submitting the questionnaire
Any interested market party that considers itself able to make a contribution to the market consultation is requested to submit the answers to the list of questions in

chapter 3 of this market consultation document by e-mail to: inkoopcentrum-iv@rws.nl before the "Closing date for the submission of completed questionnaire" referred to in paragraph 3.2. Please make use of the enclosed questionnaire in Excel format. Annexes 1, 2 and 3 provide an impression of the requirements on the equipment and the required services.

3.5 Confidentiality

RWS will treat the input from all participating market parties as confidential. RWS will exclusively reveal this information to employees and consultants directly involved in the market consultation and/or the tendering procedure, unless on the basis of legal provisions, RWS is required to make that information available to a broader audience. RWS is entitled to make use of the information provided for preparing the tendering documents. RWS will not include any specific references to participants or commercially sensitive information in the tendering documents.

3.6 Other provisions in relation to market consultation

The market consultation is not part of the tendering procedure. In order to avoid placing participants in the market consultation in a prejudiced position, RWS-CIV will be publishing the outcomes of the market consultation in the tendering documents. In addition, all information shared by RWS-CIV during the market consultation will be part of the tendering documents.
In the tendering procedure, no distinction will be made between parties that did or did not participate in the market consultation.

Information in this market consultation document may deviate from information issued at a later stage (in the framework of a tendering procedure or any other acquisition procedure). No rights may be derived from the information issued in the framework of the market consultation. The information is purely indicative and intended exclusively to enhance the quality of the market consultation. If this information is contradictory to information issued at a later stage, the later information shall prevail.

RWS-CIV will not make any payment to participants in the market consultation.

4. Questions

In answering these questions, please make use of the answer form in Excel.

A General		
	Question	**Answer**
A1	General company details Name: Address: Telephone number: Contact person: e-mail:	
A2	Have you in the past supplied products to Rijkswaterstaat or other Dutch government bodies? If so, to which parties?	
A3	Do you supply the instruments direct or via one or more regional representative(s)? Which representative(s)?	

B Fields of application and Innovation		
	Question	**Answer**
B1	Deliverability of applications: For which of the individual applications (in as far as they have already been announced) as referred to in annexes 1 and 3 can you offer a complete solution? In the first column, answer Yes or No. Additional information for example about implementation methods (makes/types) or additional explanation can be included in the comments field.	For your answers, use the applications table. Send any documentation separately.
B2	For each application in the table, please list which components or parts you cannot fulfil with COTS parts.	For your answers, use the applications table.

B3	Application parameters: If you do not expect to be able to comply with the required parameters and accompanying requirements, which parameter or requirement do you mean?	For your answers, use the applications table
B4	User requirements for the application: If you do not expect to be able to comply with the required user aspects (such as rugged design, compact design) which application or requirement do you mean?	For your answers, use the applications table
B5	Optical oxygen measurement: For the applications you scored with a Yes, can you offer additional possibilities for optical measurement of oxygen content? If yes, list the applications and accompanying measurement response time.	
B6	Additional parameters: Do you offer solutions for measuring CDOM, pCO2 and accurate pH for applications A and B in the North Sea? If yes, please give an indication of the measurement range, accuracy, measurement method and response time.	For answers, use the input table for additional parameters
B7	Do you see possibilities for RWS for expanding the scope with other (innovative) applications, techniques or parameters?	

APPLICATIONS TABLE

Application	**Deliverability yes/no (B1)**	**No COTS equipment (B2)**	**Parameters and requirements of applications that cannot be met (B3)**	**User requirements of applications that cannot be met (B4)**	**Optional comments or explanatory notes**
A Marine tow fish					
B Marine profiler					
C Inland waterways/ coastal tow fish					
D CTD measurement project					
E Multi-parameter project					

Application	Deliverability yes/no (B1)	No COTS equipment (B2)	Parameters and requirements of applications that cannot be met (B3)	User requirements of applications that cannot be met (B4)	Optional comments or explanatory notes
G Manual temperature measurement					
H Manual light intensity measurement					
I Measuring pontoon flow-through system					

TABLE FOR ADDITIONAL PARAMETERS (B6)

Application	Deliverability	Explanatory notes
CDOM		
pCO2		
More precise pH		

	Question	Answer
C1	Paragraph 1.5 refers to a possible breakdown into two lots. Is the proposed breakdown according to areas of application in your opinion a good and clear breakdown?	
C2	Do you have further suggestions for a breakdown in lots other than that referred to?	
C3	As stated, RWS is striving for standardisation. Solving the largest possible number of applications with the same instrument type. What breakdown into groups of applications with the same instrument type would you recommend on the basis of your range?	
C4	As a market party, in which lot are you interested?	

C5	The technical service life of the current instruments for lot 1 North Sea has not yet been reached. For reasons of cost efficiency, RWS-CIV is therefore not in favour of contracting new systems, but maintenance, additional services and optional additional parameters for the existing instruments. What is your view and why?	

D Service provision and Contract management		
	Question	**Answer**
D1	Do you see possibilities for providing the services referred to in the Services table? For each intended lot, it is sufficient to indicate whether or not you are interested, and if yes, whether this is already a business activity. In the comments field, you can indicate whether you are able to fulfil part of this service.	For answers use the services table
D2	As described in paragraph 2.3, RWS-CIV recognises the importance of supplying the requested products and services subject to quality assurance. How does your company guarantee the quality provided and do you operate a quality management system?	
D3	In paragraph 2.3, RWS-CIV indicates that it wants the contractor to submit proposals for explaining the quality of the services provided. Which (additional) possibilities do you see for demonstrating the quality of the products and services provided yourselves? In your opinion, what are the advantages and disadvantages of this approach?	
D4	As described in paragraph 2.3, RWS-CIV is looking for a form of contract management that ensures minimum administrative burdens for both the supplier and RWS-CIV. What possibilities do you see for an efficient system of contracting and billing? Is it for example attractive for you to agree on annual prices?	

SERVICES TABLE (D1)

Services	Lot 1 North Sea: Unable to offer / Yes, interested / Yes, already company activity	Lot 2 Inland waterways: Unable to offer / Yes, interested / Yes, already company activity	Optional comments or explanatory notes
Collection, preparation for use and issue of systems			
Service counter function for users			
System storage			
System transport			
Stock records and periodic reporting			
User support			

E Other		
	Question	**Answer**
E1	This market consultation has been issued both in English and Dutch. You can submit your answers in English or Dutch. In the past, tenders were always issued in Dutch only. Do you have objections to the use of Dutch? If yes, what are your objections?	
E2	Please give any reasons for not wishing to participate in the tendering procedure	
E3	Do you have any further suggestions or ideas?	

Annex 1 Measurement applications

This annex describes each of the various applications. More actual details and specific characteristics of each application appear in the applications table in annex C. This text provides explanatory notes to this table.

Application A marine tow fish

Description

The application in the marine tow fish refers to a frame containing sensors that is towed through the water, while carrying out the measurements, in order to acquire a wide range of parameters. This work is carried out from the survey vessel Zirfaea, along routes in the North Sea.

For carrying out these route measurements, each measuring campaign consists of sailing measuring trajectories for a one-week period. Measurements are carried out on the Zirfaea, on a two-weekly basis. A tow fish containing instruments is towed at high speed (up to a maximum of 15 knots) several metres below the water surface. The surveyor operates the entire measurement array from the measuring room.

Functionality

The application consists of sensors, an underwater unit and a deck unit. In the water, the sensors simultaneously measure the required parameters. The temperature and conductivity parameters are measured in duplicate. By means of a sensor pump, water is directed past the measurement instruments. The underwater unit is responsible for communication with the sensors, and the necessary power supply to the sensors. The deck unit is responsible for communication and power supply to the underwater unit, and is connected to the data acquisition computer used to operate the system. Using the software supplied with the system, the measurement system is operated, and data acquisition is assessed and monitored in real time. In the future, CDOM, pCO2 and precise pH will be measured, for which the underwater unit and deck unit have the relevant connection points.

Context

Figure 2 shows the scope of the application (in blue) in the context objects beyond the scope (red):

- The measuring system is inserted underwater in an **existing steel tow fish**, see Figure 1.
- The signal is transmitted to the deck via an **existing 2-core umbilical**.
- The signal from the **existing 2-core umbilical** is carried via an **existing slip ring** and the deck unit to the **existing data acquisition computer**, for data retrieval.
- The system receives external power supply via an **existing power supply unit**.
- In addition, the frame includes a pneumatic-driven **pump** for the simultaneous carrying out of sampling.

Current instrumentation

The application consists of the following existing instrumentation within the scope*:

Component	**Manufacturer**	**Type**
Deck unit	Seabird	SBE11+
CTD integrated in frame	Seabird	SBE 9+
Conductivity sensor	Seabird	SBE 4 C-2
Temperature sensor	Seabird	SBE 3F
pH sensor (right-angle)	Seabird	SBE 18-1
Dissolved oxygen sensor	Seabird	SBE 43
Underwater sensor pump	Seabird	SBE 5T
Turbidity sensor	D&A Instruments	OBS 3+
Fluorescence sensor (fChl)	Chelsea	AquaTrack alpha (10/25cm)

*The existing instruments do not include sensors for CDOM, pCO2 and precise pH. The new supply of these sensors is within the scope.

Figure 1 Application A Marine tow fish on deck

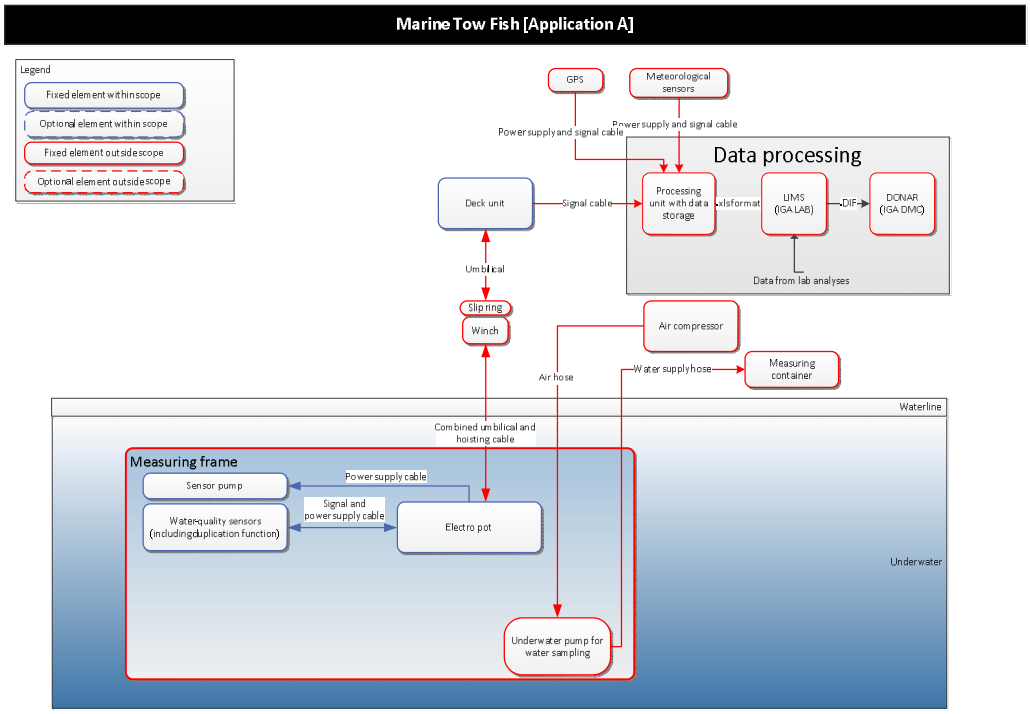

Figure 2 Technical scope of Application A

Application B Marine profiler

Description

The application in the marine profiler consists of a frame with sensors and water sampler that is lowered vertically into the water for the acquisition of a large number of parameters. This work is carried out from the survey vessels Zirfaea and Arca at locations in the North Sea.

The profiles are measured at fixed locations located in the measuring grids outlined in application A. Measurements are carried out from the Zirfaea on a two-weekly basis. The Arca is deployed several times a year to replace the Zirfaea, and in the event of disasters. Ideally, profiles are taken while the measuring equipment is lowered into the water at drop speed, carrying out good, representative measurements. The surveyor operates the entire measurement array from the measuring room.

Functionality

The application consists of sensors, an underwater unit, a rosette sampler and a deck unit. In the water, the sensors measure the required parameters simultaneously. The temperature and conductivity parameters are carried out in duplicate. By means of a sensor pump, the water is directed past the measuring instruments. The underwater unit combines the signals from the sensors and echo sounder. The underwater unit passes on the control signal to the rosette sampler, and distributes the power supply across the sensors, echo sounder and rosette sampler. The deck unit links the umbilical with the on-board computer for receiving the signals from the profiler and the mast (light intensity PAR), the rosette sampler control signal and the power supply for the array. In addition, real-time raw measurement data is observed on board to allow the measurements to be fine-tuned if necessary. This possibility is also used to instruct the rosette sampler to take a sample at a specific depth. In the future, CDOM, pCO2 and precise pH will be measured, for which the underwater and deck unit are fitted with connection points.

Context

Figure 4 shows the scope of the application (in blue) in the context objects beyond the scope (red):

- The measuring system is inserted below water on an **existing stainless steel profiler frame**, see Figure 3.
- In the top of the frame is an **existing Rosette sampler** for the taking of representative water samples at specific depths.
- The signal from the **existing 2-core umbilical** is carried via an **existing slip ring** and the deck unit to the **existing on-board computer** for data acquisition.
- The frame also includes an **existing echo sounder** (Teledyne Benthos PSA-916).
- The signal from the **existing umbilical** is transported via the deck unit to the existing on-board computer for data retrieval.
- The system receives external power supply via an **existing power supply unit.**

Current instrumentation

The application consists of the following existing instrumentation within the scope *:

Component	**Manufacturer**	**Type**
Deck unit	Seabird	SBE 11+
CTD integrated in frame	Seabird	SBE 9+
Conductivity sensor	Seabird	SBE 4 C-2
Temperature sensor	Seabird	SBE 3F
pH sensor (right-angle)	Seabird	SBE 18-1
Dissolved oxygen sensor	Seabird	SBE 43
Underwater sensor pump	Seabird	SBE 5T
Turbidity sensor	D&A Instruments	OBS 3+
Fluorescence sensor (fChl)	Chelsea	AquaTrack III (10/25cm)
PAR sensor (underwater)	Biospherical Instruments	QSP-200L

PAR sensor (above water)	Biospherical Instruments	QSP-240
Water sampler (carousel)	Seabird	SBE 32, with Niskin bottles

*The existing instrumentation does not include sensors for CDOM, pCO2 and precise pH. The new supply of these sensors is within the scope.

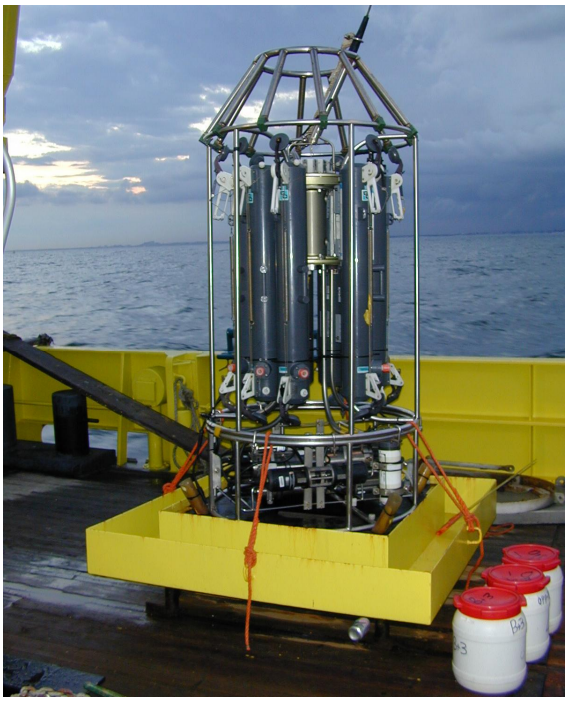

Figure 3: Application B Marine profiler full measurement array

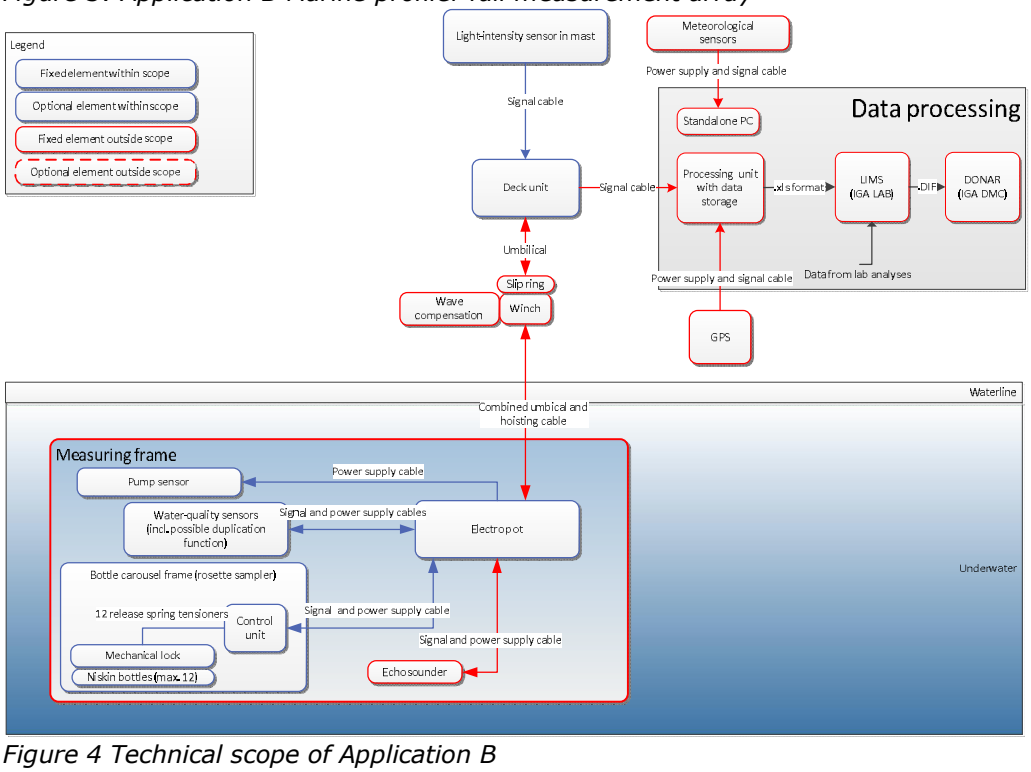

Figure 4 Technical scope of Application B

Application C1 Tow fish and profiler inland waterways/Zeeland coast

Description

The application in the tow fish/profile consists of a frame with sensors that is towed through the water, while carrying out measurements, for the retrieval of a large number of parameters. This is carried out from the survey vessels Roompot and Delta.

The route measurements are carried out alternately with a survey vessel in weekly measuring campaigns lasting 4 days, in the Zeeland delta and off the coast of Zeeland. During the summer period, simultaneous measuring campaigns are undertaken. During this process, the vessels travel at a speed of up to 10 knots in order to carry out the measurements as rapidly and efficiently as possible.

The route measurements are combined with the measurement of vertical profiles with a view to determining salt intrusion in the Zeeland delta.

Functionality

The application consists of sensors and an underwater unit. In the water, the sensors simultaneously measure the required parameters. The underwater unit is responsible for communication with the sensors and for the power supply necessary for the sensors. To determine extinction, the PAR light intensity is measured both in the mast and on top of the measuring frame. In addition, during measuring, water samples can be taken using a sample pump on the deck, for representative analyses in the lab. Using the system software, the measuring system is operated and data acquisition is assessed and monitored in real time.

Context

Figure 6 shows the scope of the application (in blue) in the context objects outside the scope (red):

- The sensors including 1 light cell are mounted in an **existing stainless steel frame** of a different type for each vessel, see Figure 5.
- The **existing echo sounder** (type Kongsberg 1007) in the bottom of the frame is combined by the underwater unit.
- The signal from the underwater unit is transported via the **existing 7-core umbilical** and an **existing slip ring** to the **existing on-board computer** for data retrieval.
- The light sensor in the mast is connected directly to the **existing on-board computer** for data retrieval.
- The system receives external power supply from an **existing power supply unit** on board, via the **existing 7-core umbilical**.

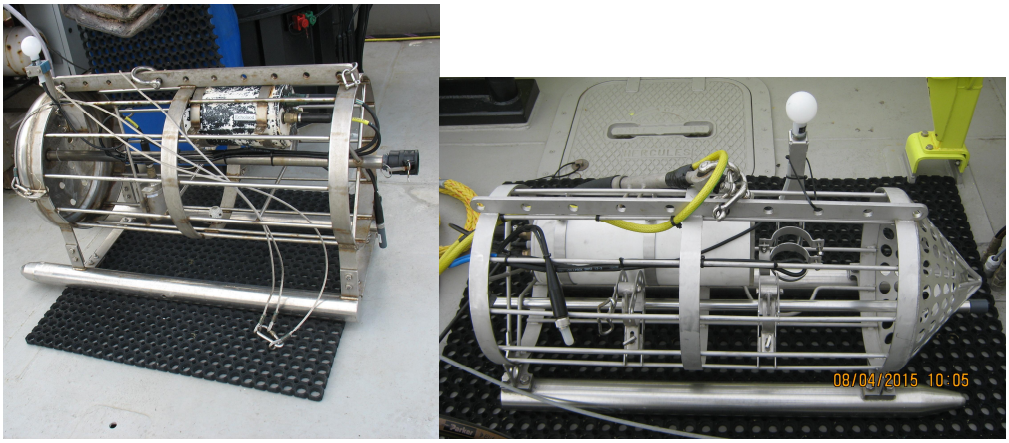

Figure 5: Application C1 Tow fish / profiler inland waterways Zeeland coast full measuring array (left Delta and right Roompot)

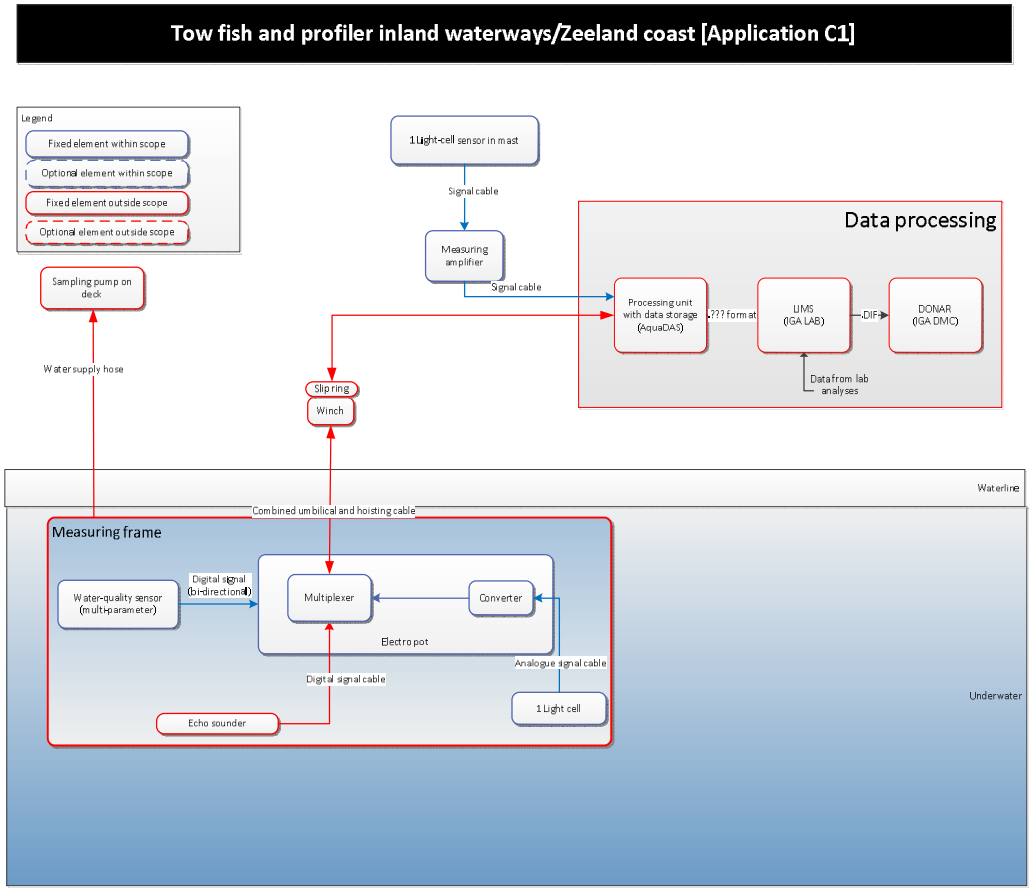

Figure 6 Technical scope of Application C1

Application C2 and C3 Tow fish and profiler inland waterways/ IJsselmeer coast, Wadden Sea, rivers

Description

The application in the tow fish consists of a frame with sensors that is towed through the water while carrying out measurements, in order to acquire a wide range of parameters. This is carried out from on board the survey vessels Harder, Asterias, Zuiderzee and De Nes.

The route measurements are carried out in weekly measuring campaigns lasting not more than a few days. Measurements are carried out on the Wadden Sea, IJsselmeer, Markermeer, Randmeren, North Sea Canal and the Meuse area of Zuid-Holland. During the summer period, simultaneous measuring campaigns are carried out. The vessels sail at a speed of up to 10 knots to carry out the measurements as rapidly and efficiently as possible.

Functionality

The application consists of sensors in a tow fish and a signal and power supply cable. In the water, the sensors simultaneously measure the required parameters. Communication with the sensors and the required power supply for the sensors are supplied directly from the deck. In addition, during measurement, water samples can be taken using a sample pump (either on deck or in the frame) for representative analyses in the lab. Using the system software, the measurement system is operated and the data acquisition is assessed and monitored in real time.

Context

Figure 8 shows the scope of the application (in blue) in the context objects outside the scope (red):

- The sensors are mounted in an **existing steel frame** of a different type for each vessel, see Figure 7.
- The signal from the sensors is transmitted via the signal cable to the **existing on-board computer**, for data acquisition.
- The system receives external power supply from an **existing power supply unit** on board.
- In addition, there is a **sampling pump** in the frame (De Nes) or a **sampling pump** on deck with a **water supply hose** (Harder, Asterias, Zuiderzee) in the frame, with which samples can be taken simultaneously.

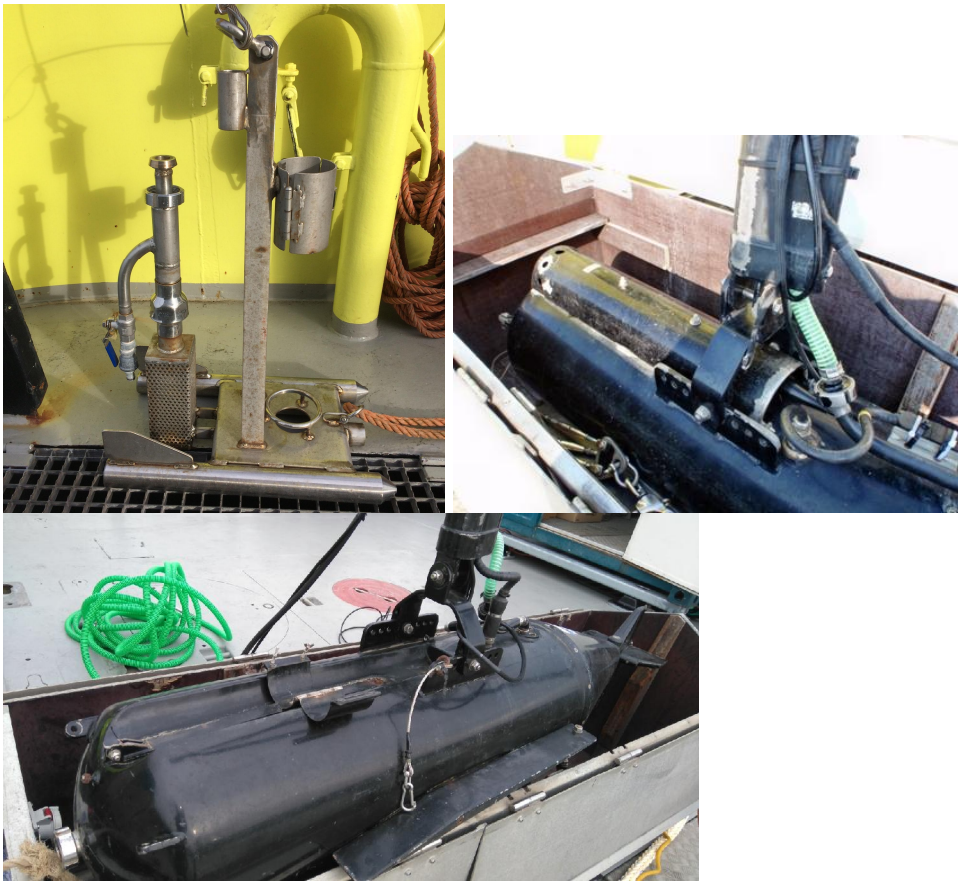

Figure 7: Application C2 Tow fish inland waterways/ IJsselmeer coast, Wadden Sea, rivers complete measuring array (top 2 on Harder, Asterias, Zuiderzee, below De Nes)

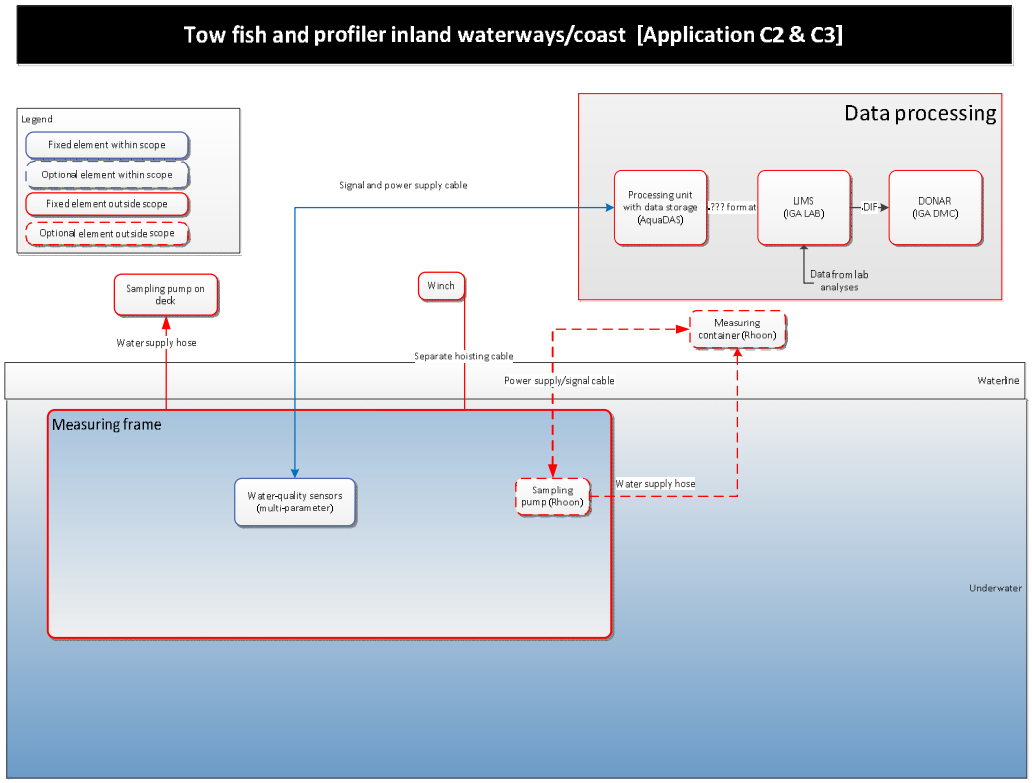

Figure 8 Technical scope of Application C2

Application D Project CTD measurement

Description

The application relates to fixed sensors in the water, that autonomously measure conductivity, temperature and depth. This is carried out from a dock wall or lock chamber wall.

The project measurements are carried out in measuring campaigns lasting between 1 and 2 days, with a period of several weeks to several months between each measuring campaign. Measurements are carried out close to maritime engineering structures in seawater or brackish water, with the aim of allowing an analysis of salt movement in the water. Multiple strings of sensors are used, suspended at different depths. At the end of the measuring campaign, the sensors are read out at the office. The typical characteristics of this application are autonomous power supply and data storage and anti-fouling.

Functionality

The application consists of multiple autonomous sensors that are suspended in strings. In the water, the sensors measure the required parameters simultaneously. Each individual sensor has its own power supply and data storage. The measurement system data is subsequently retrieved using the system software.

Context

Figure 9 shows the scope of the application (in blue) in the context objects outside the scope (red):

- The sensors are fitted on a dock wall with **existing attachment materials.**
- The stored measurement data is subsequently retrieved via a signal cable on an **existing computer**.
- The system provides its own power supply which can be recharged in advance via an external source from an **existing power supply unit.**

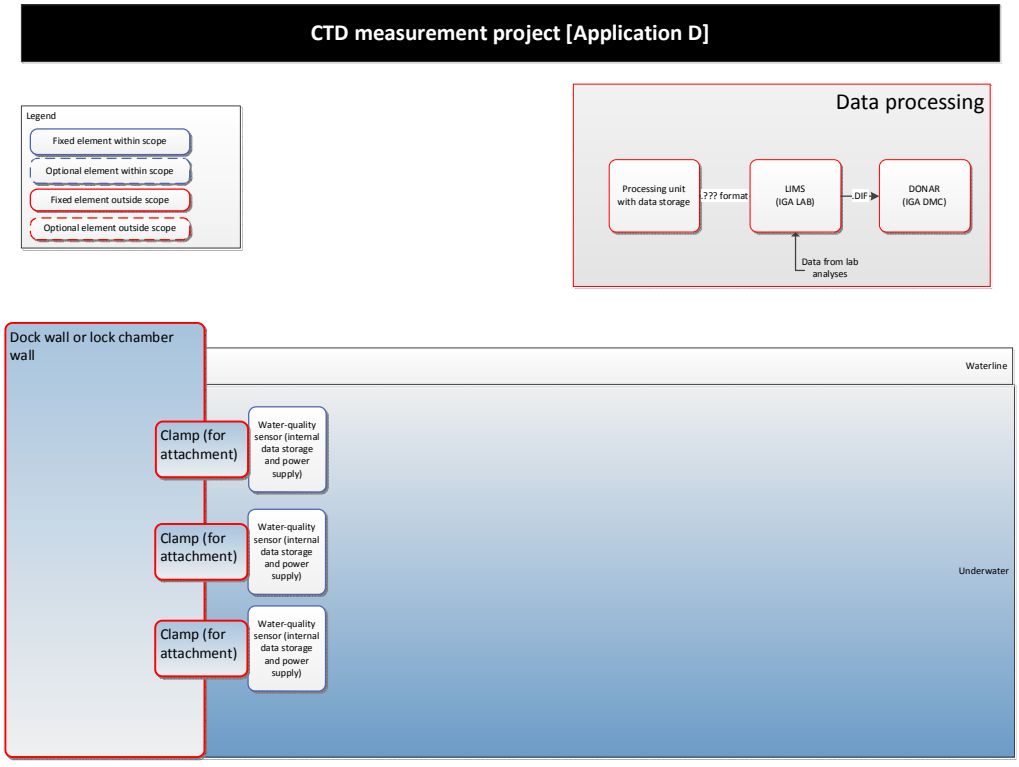

Figure 9 Technical scope of Application D

Application E Multi-parameter for projects

Description

The application relates to a frame with sensors that is placed on the bed in order to acquire a wide range of data parameters. This is carried out in Zeeland, the IJsselmeer area and the Wadden Sea.

The project measurements are carried out in measuring campaigns lasting approx. 1 month, with a period of several months between each measuring campaign. The measurement locations are in seawater or freshwater. Depending on the measurement requirements of the project, the location is selected. Onshore, the sensors are mounted on a measuring frame, and placed on the bed from a ship. At the end of the measuring campaign, the sensors are read out at the office.

Functionality

The application consists of sensors with internal power supply and data storage. In the water, the sensors measure the required parameters simultaneously. Using the system software, data from the measuring system is subsequently retrieved. The typical characteristics of this application are autonomous power supply and data storage and anti-fouling.

Context environment

The scope of the application in relation to the context objects beyond the scope relates to:

- The sensors are fitted in an **existing steel frame**.
- The stored measurement data are retrieved at the end of the measuring campaign via a signal cable onto an **existing computer**.
- The system provides its own power supply which can be recharged prior to the measuring campaign via an external source from an **existing power supply unit.**

Application F Manual measurements general multi-parameter

Description

The manual measurement multi-parameter application refers to a manageable instrument that is suspended into the water from a ship, in order to acquire a wide range of data parameters. This is carried out from on board the survey vessels Harder, Asterias, Zuiderzee and De Nes.

The measurements are carried out several times a day during the weekly measuring campaigns. Measurements are carried out on the Wadden Sea, IJsselmeer, Markermeer, Randmeren, North Sea Canal and the Meuse area in Zuid-Holland. During this process, the instrument is lowered to just below the water surface directly from the ship, with the vessel stationary or sailing very slowly.

Manual salt measurements are also carried out in the IJsselmeer area and in the North Sea Canal. Using a cable, the instrument is lowered to the required depth.

Functionality

The application consists of sensors, signal and power supply cable and a handheld unit. In the water, the sensors measure the required parameters simultaneously. The measured values can be immediately read out by the surveyor who is responsible for suspending the instrument over board. The typical characteristics of this application are autonomous power supply and data storage.

Context

Figure 10 shows the scope of the application (in blue) in the context objects outside the scope (red):

- The stored measurement data are retrieved following the measuring campaign onto the **existing computer** via a signal cable.
- The system provides its own power supply which can be recharged prior to the measuring campaign via an external source from an **existing power supply unit.**

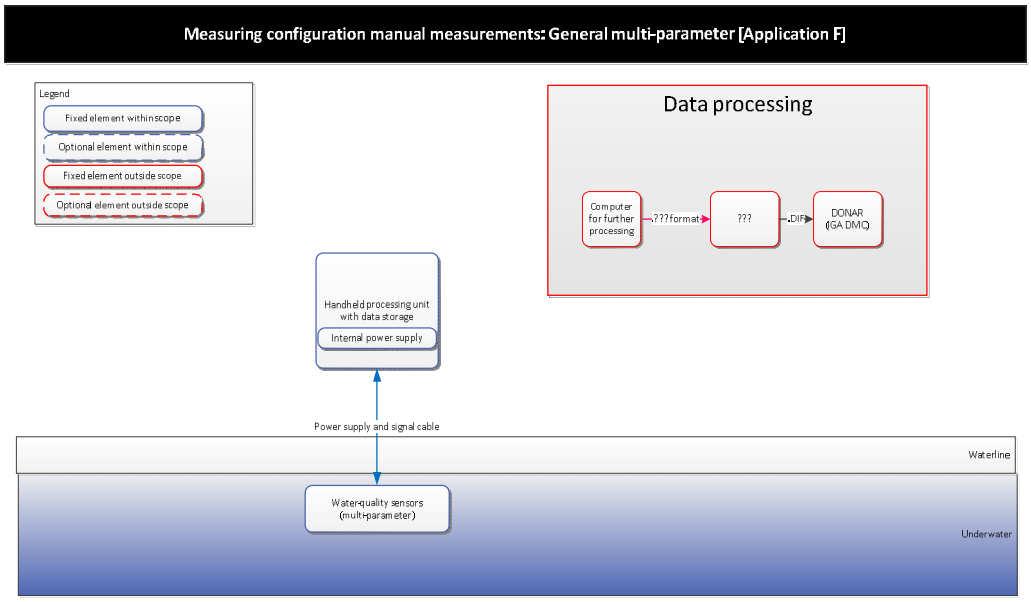

Figure 10: Technical scope of Application F

Application G Manual measurements temperature

Description

The manual temperature measurements application relates to a manageable instrument that is used on board ships to measure the temperature. This is carried out on the survey vessels Harder, Asterias, Zuiderzee and De Nes.

The measurements are carried out once during the weekly measuring campaign in order to calibrate the temperature sensor from applications C and F in the field. Measurements are carried out on the Wadden Sea, IJsselmeer, Markermeer, Randmeren, North Sea Canal and the Meuse area in Zuid-Holland. The instrument is suspended into a calibration drum, in which the instrument to be calibrated has also carried out a measurement.

Functionality

The application consists of a sensor, signal and power supply cable and a handheld unit. In the water, the sensors measure the temperature. The measured values can be immediately read out by the surveyor, who suspends the instrument in the calibration array. The typical characteristics of this application are autonomous power supply and data storage.

Context

Figure 11 shows the scope of the application (in blue) in the context objects outside the scope (red):

- The system provides its own power supply that can be recharged prior to the measuring campaign via an external source from an **existing power supply unit.**

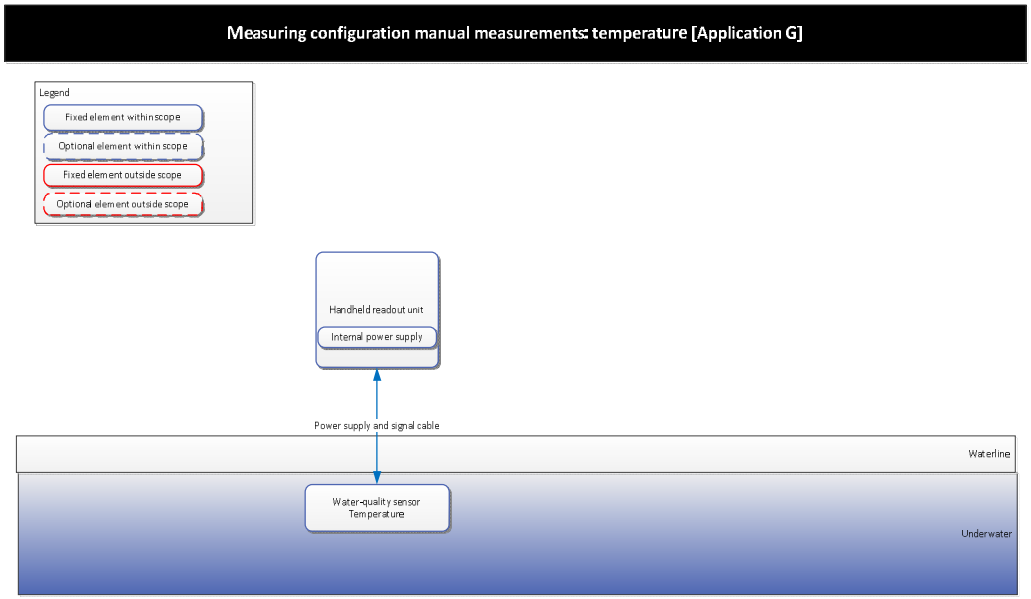

Figure 11: Technical scope of Application G

Application H Manual measurement PAR light intensity

Description

The manual measurement light intensity application relates to a set of light sensors used on board a ship or measuring pontoon to determine the extinction of light in the water. This is carried out on the survey vessels Harder, Asterias, Zuiderzee and De Nes and the measuring pontoons in Eijsden and Lobith.

This relates to a configuration in which two light sensors simultaneously measure the light intensity. In seawater, 1 light cell is fitted in the mast of the ship and 1 light cell in a manageable measuring frame. To carry out a measurement, the frame is lowered into the water by hand, and placed at the required depths. The sensors are dried and stored away after the measurements.

Functionality

The application consists of two light cells, cabling and a readout unit. The sensors simultaneously measure the light intensity. The measured values can be read out directly by the measuring leader, who suspends the instrument overboard. The typical characteristics of this application are autonomous power supply and data storage. The measurement data about light intensity are stored and subsequently read out on a computer, before being further processed into an extinction coefficient.

Context

Figure 13 shows the scope of the application (in blue) in the context objects outside the scope (red):

- In freshwater, two light cells are fitted in an **existing steel frame**. In seawater, 1 sensor is fitted in the mast of the ship and 1 in an **existing steel frame**. Figure 12 shows both configurations.
- In seawater, an **existing pressure sensor** (type GE sensing) at the bottom of the frame is connected to the readout unit.

Figure 12: Application H Manual light intensity PAR (left for freshwater and right for seawater)

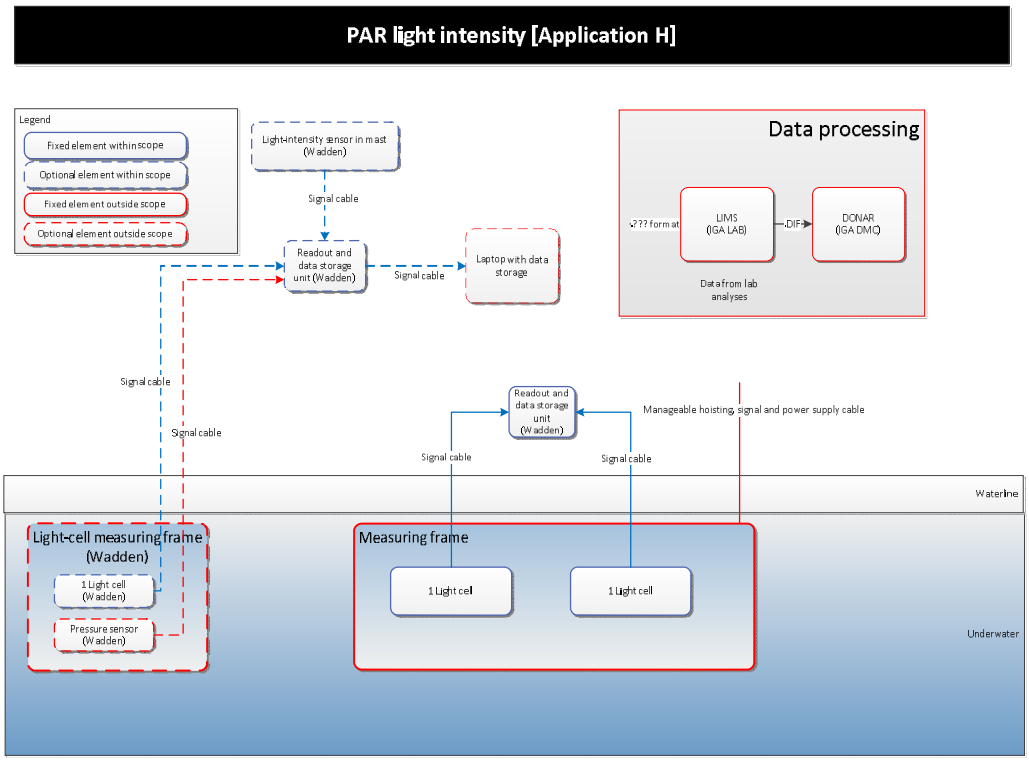

Figure 13: Technical scope of Application H

Application I Measuring pontoons in flow-through system

Description

On the measuring pontoons in Eijsden, Lobith and Bimmen, multi-parameter probes are inserted in a flow-through system. Water from the Meuse and Rhine rivers is pumped up and submitted to (laboratory) analysis systems via pipe circuits. The multi-parameter probe is fitted in the pipe circuit.

Description

The application on the measuring pontoon relates to a fixed measuring array with sensors that remain continuously in the water in order to acquire a wide range of parameter data. This is carried out from measuring pontoons in Eijsden, Lobith and Bimmen (Germany).

The sensors continuously measure in order to generate a 10-minute value. These values are retrieved in real time, and used as alarm values.

Functionality

The application consists of sensors and a signal/power supply cable. In the water, the sensors simultaneously measure the required parameters. The signal/power supply cable is responsible for communication with the sensors and the necessary power supply for the sensors. Because measurements are carried out continuously using the sensors, and because the sensors therefore remain continuously in the water, there must be anti-fouling facilities. Using the system software, the measuring system is operated and the acquired data is assessed and monitored in real time.

Context

Figure 15 shows the scope of the application (in blue) in the context objects outside the scope (red):

- The sensors are fitted in an **existing measuring array** of a different type for each location, see Figure 14.
- The light sensors are connected directly to the **existing processing computer** and the data is retrieved.
- The system receives external power supply from an **existing power supply unit** on shore.

Figure 14: Application I Measuring pontoons flow-through systems (left typical for Lobith and Eijsden, right in Bimmen)

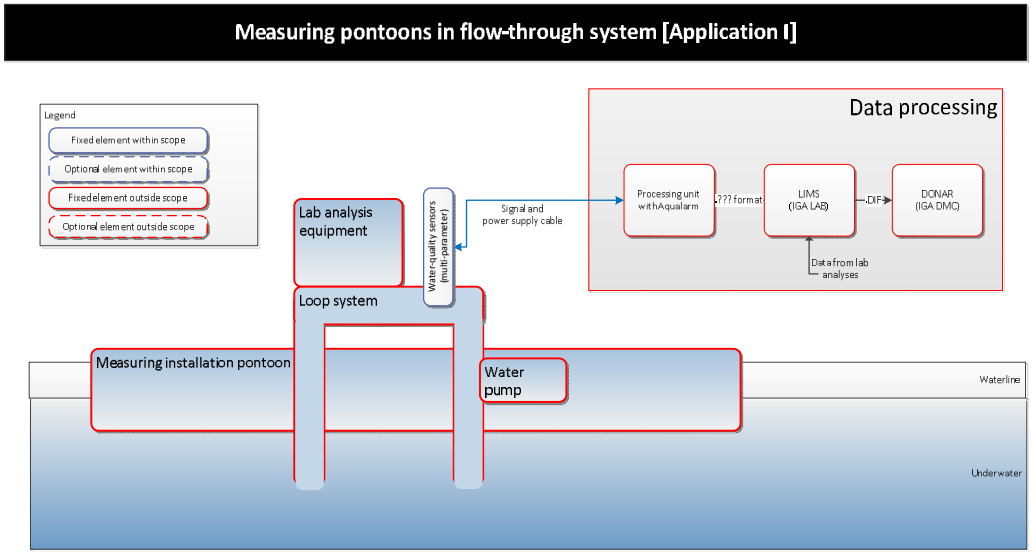

Figure 15: Technical scope of Application I

Annex 2 Service description

2.1 Preventive and corrective system maintenance (sub c)

With an inspection of the system at the premises of the contractor, the (technical) condition, operation and completeness of the instrument will be determined following use. This will assist in process improvement within RWS and help determine what services are required on the system in order to prepare it for correct redeployment. The inspection will take place within an agreed time limit, and will be recorded.

Preventive maintenance consists of regular tasks for returning (or keeping) the instrument in working condition, so that it complies with the required precision, availability and reliability. These tasks will in principle be identical on each occasion. If during preventive maintenance a defect is observed, the procedure for corrective maintenance will be followed. Corrective maintenance will consist of tasks for repairing observed non-conformities and defects, and any additional work on the instrument. These are tasks of variable scope as determined on each occasion. The results will be recorded.

The lead time for this maintenance may be freely determined subject to the condition that the response time for issue is fulfilled. See below.

2.2 Collection, preparation for use and issue of systems (sub e)

Following use, the contractor will be responsible for collection of the system for preventive maintenance. The instrument is then placed on stock. When prepared for service, the instrument is once again available and completely ready for delivery to and use by RWS users. This includes:

- the calibration of sensors (in as much as this could not be carried out during preventive maintenance)
- assembly of the required components and accessories
- final inspection for operation and completeness
- responsibility for and recording of delivery

Preparation for use and issue is subject to an agreed delivery deadline.

2.3 Service counter function for users (sub f)

In the current situation, CIB employees fulfil the service counter function for the users of measuring systems, in which all operational details necessary for the collection and issue of systems are dealt with. The wish at RWS is to use this tender to further transfer these tasks to the contractor, who is responsible for technical operation of the instruments. The contractor will be responsible for the majority of content-related communication with the users:

- following use, consultation with users about transport and retrieval of user findings (complaints, non-conforming data, defects)
- upon issue, consultation with users about the required scope of delivery (type, scope, configuration) and delivery details (address, time, etc.)

The content of this communication will be recorded to secure the process, and for the required periodic reports.

2.4 Storage of systems (sub g)

Maintaining a stock of the systems supplied to RWS, with the purpose of keeping the maintenance and issue process efficient, and to gradually reduce the scale of physical operations at RWS. The contractor will handle the systems that he manages and maintains on stock for RWS with due care.

2.5 System transport (sub h)

The contractor is responsible for the sound transport of systems from and to user locations. The contractor will demonstrate due care for the articles to be transported. This includes ensuring that the articles are transported in the correct conditions, and that suitable means of transport are deployed.

2.6 Stock records and periodic reporting (sub i)

The contractor will maintain administrative records on behalf of RWS of

- the stock of systems in storage
- the stock of accessories and consumables in storage that remain the property of RWS

The contractor will also report periodically on the fed back user findings and findings during inspection and preventive maintenance. These reports (if applicable) will be accompanied by recommendations or improvement proposals. The objective is to identify improvements in the use and maintenance process, and possible technical improvements. These may relate to recurring defects, bugs, incorrect use and location or ship-specific problems. These reports will also be used for effective contract management and budget planning.

2.7 Support during use (sub d)

The user can expect to receive direct support during use of the systems from the contractor. This may take the form of telephone support or support at the use location. This support is required if users have questions about the installation, adjustment, alternation, operation of instruments or the analysis and possible solving of what users perceive as a problem in respect of the use of the system. It is also possible to request advice, for example in configuring new measuring installations, during data analysis or during technical quality assurance. This support relates only to the instruments, operating and processing software supplied by the supplier.

Support is requested during office hours on working days, subject to agreed response times (with the exception of advice, the cost of which will be determined on a case by case basis).

Annex 3 Application table

See separate pdf document