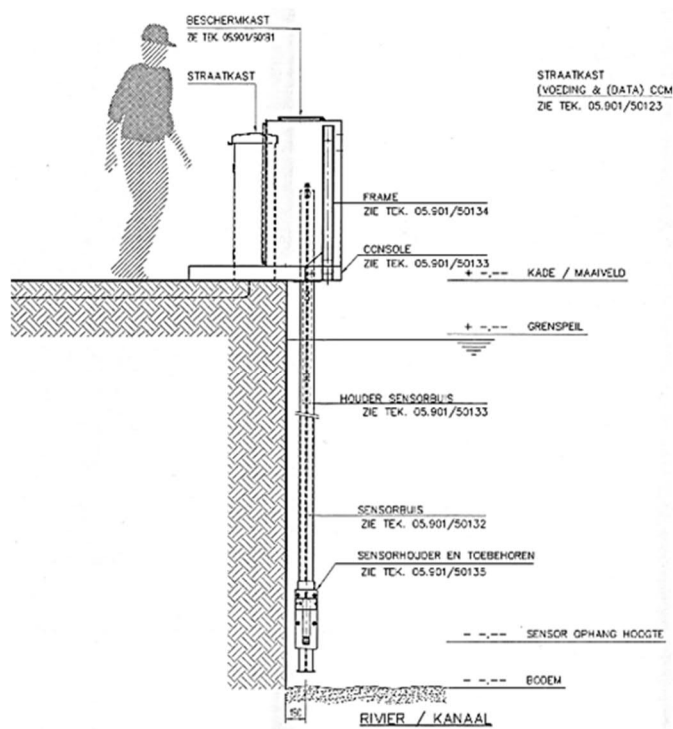




RWS INFORMATIE

Market Consultation

CT sensors for National Water Measuring Network



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Introduction

For the implementation of its tasks, Rijkswaterstaat (RWS) requires information about the state of the acreage that it manages. This includes information on water quality and water quantity. RWS uses this information for implementation of the primary processes water management and maritime traffic management. The RWS Central Information Provision Service (RWS CIV) provides this information. A part of this information is obtained by RWS itself at measuring stations at fixed measuring locations in the Dutch National Water Measuring Network (LMW). The team Instruments at CIV ensures availability of the sensors to be used in the LMW. Use is being made at present of TRDI Citadel CT-EK sensors for measuring conductivity and temperature in the LMW.

1 Envisaged procurement

RWS is intending to call for tenders for the supply and maintenance of conductivity and temperature sensors (CT sensors). The sensors to be supplied replace the current sensors. The technical scope of the envisaged contract concerns CT sensors and connection cables. The measurement set-up and data collection equipment for the application of the sensors are outside of this scope. However, these bring about the sensor's requirements.

The intended contract includes the following topics:

- Supply of the initial number of sensors for implementation
- Supply of replacement models and spares for the duration of the contract
- Availability and technical continuity for the duration of the contract
- Preventive maintenance (cleaning, inspecting and calibrating) 'in the workshop'
- Corrective maintenance (repairs, upgrades) 'in the workshop'
- Transportation from and to RWS for maintenance
- Support for maintenance personnel (training, help desk, providing advice at the measuring location)

The contract provides for an initial duration of eight (8) years with a subsequent optional one-time extension of three (3) years and thereafter twice for two (2) years (combined to a maximum of fifteen (15) years).

2 General context for applying the CT sensors

In the LMW, salinity measurements are carried out to determine saline intrusion in estuaries and channels, to manage water intake points along rivers and to determine salt transport at locks and inlets. This data is determined based on real-time locally measured conductivity and temperature.

2.1 Quantities

There are currently 56 measuring locations. Measurements are usually taken at several depths, making a total of 105 sensors currently being in operation. We also anticipate 40 sensors in the reserve pool and those underway in the maintenance process. This means a number of initial deliveries totalling about 150 devices in the first three (3) years. Furthermore, an additional need may possibly arise from any future development of the measurement programme with about 50 extra sensors in operation, for which extra deliveries can be requested. In addition, optional deliveries will be requested during the term for replacement of defective devices.

2.2 Management of measurement set-ups and sensors

Keeping the measurement set-ups in operation is of major importance to guarantee the availability of information. Hence a distinction is made between two types of maintenance:

- The management and maintenance of all the measurement set-ups on site is vested in the maintenance contractors; this includes civil engineering maintenance and the 'primary sensor maintenance'. This primary sensor maintenance consists of all actions required at the measuring location: installation, regular cleaning, inspection measurements and troubleshooting. For other maintenance of the sensors, the sensors will be taken to shore. For this purpose, a replacement device will first be installed which has been taken from the reserve pool stock. Maintenance crews at the measuring locations always have sensors at hand which are ready for use.
- Follow-up maintenance is part of the envisaged contract. This concerns (among other) the preventive maintenance: the thorough periodic maintenance 'in the workshop', inspection and calibration. If necessary, corrective maintenance also occurs: this concerns repair of the sensor.

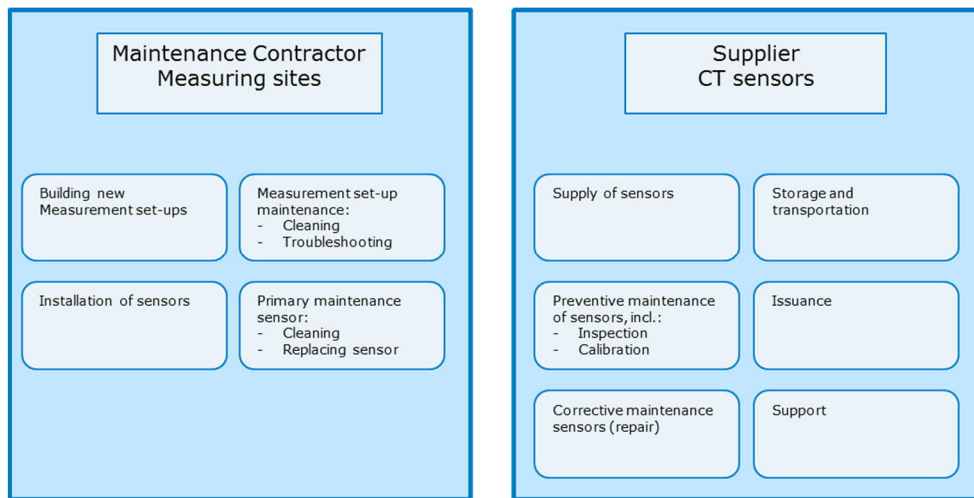
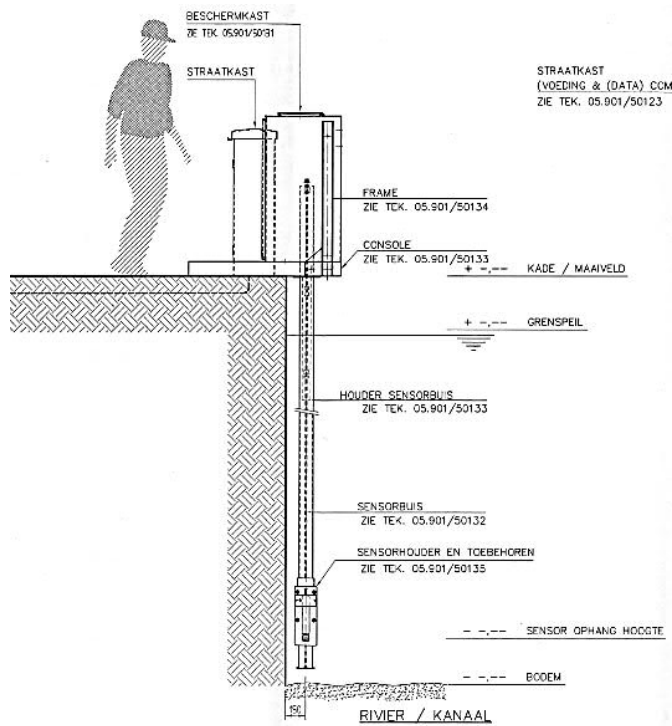


Figure 1: Block diagram of management of measurement set-ups and sensors

3 Characteristics and challenges of maintenance at measuring locations

Maintenance at the measuring locations involves relatively high costs. This is due to aspects like accessibility: of the 56 measuring locations, 33 can only be reached by ship. Maintenance at the measuring locations is carried out by maintenance personnel who also maintain various other installations (not measuring specialists). In primary maintenance, the sensor and measurement set-up (with which the sensor is placed in the water) are cleaned and the measurement checked. If calibration or an adjustment are needed, the sensor is exchanged and the sensor is sent to the sensor supplier for follow-up servicing. The time spans for primary and follow-up maintenance thus largely determine the costs. In making a selection of suitable sensors, we see a number of challenges:

- Fouling: In the summer season fouling is common. This is dependent on various circumstances (sunlight, water temperature, salinity, nutrients, depth) and plays a role at the bulk of our measuring locations. Depending on the location, these are barnacles, algae or seaweed. Non-organic materials such as sludge could also be deposited on sensors. If this causes the sensor's measurements to deviate, a service visit is required. The required primary maintenance period at these locations may be up to once every two weeks for the current sensor.
- Sensor drift: The required measurement uncertainty is minor at some of the measuring locations. This means that these locations must be visited to be able to monitor the drift with control measurements and to exchange the sensor, if necessary. The combination of specifications for measurement uncertainty and sensor drift therefore have an influence on the maintenance period.
- Power: At many locations, the energy supply is generated with solar panels. This means that there is a limited amount of power available for the sensors. Greater power consumption by the sensors could mean that the energy supply must be expanded. This entails additional costs, and the question arises whether this is technically possible on smaller measurement posts.
- Constructive adaptation: for implementation of the sensors, the measurement set-ups must be adapted. The requirements for installation determine the costs involved for this.
- Maintainability and robustness: implementation of the sensor must be able to withstand environmental conditions and regular cleaning in the field. The staff is a generic maintenance crew and works under a variety of weather conditions, which means that no delicate treatment can be expected. This determines the life span of the sensor.



Figures 2 and 3: Impression of a measurement set-up. There are several set-up variants, one of which is the version shown.

4 Distinguishing requirements

To be able to get an understanding of the requirements for applying CT sensors in the LMW, a number of distinguishing requirements are mentioned below. The requirements are always minimum requirements which must be fully met. The requirements below are provisional requirements and may still be altered by us; the full and actual requirements will be published in the invitation to tender.

Sensor type	
Delivery	A single sensor type suitable for use in the various LMW measurement set-ups.
Delivery guarantee	Availability of this type over a period of at least 5 years, thereafter availability of an equivalent successive model.
Measuring range	0 – 6000 mS/m
Measurement uncertainty	max. 3 mS/m max. 0.1 °C
Sensor drift	max. 1 mS/m/mth max. 0.01 °C
Output message	Issuance of digital message with measurement and output frequency minimum 1Hz
Power consumption	max. 2 W
Maintenance period	The sensor must function correctly without maintenance for four weeks, even under conditions of intensive fouling. The sensor must function correctly for three months with intermediate cleaning, but without any form of calibration.
Maintainability	The sensor must be robust enough to withstand regular amounts of cleaning with generic maintenance staff and generally available aids.
Services	
Preventive maintenance	The contractor offers a service for full preventive maintenance to make the sensor suitable for a new period of use. This includes, in any event, the functional testing, calibrating and, if necessary, adjusting.
Maintenance turnaround time	The turnaround time of preventive maintenance is up to six weeks, calculated from collection to availability in the reserve stock.
Storage	The contractor provides a service for the storage of the reserve stock sensors. This offers an opportunity to calibrate directly before issuance occurs, ensuring a maximum term of use.
Issuance of sensors	The contractor offers a service for issuance of the sensors for use at the measuring location. This entails a final calibration, handling and transportation to a location indicated by RWS in the Netherlands. The service level for the issuance is: issuing within one week, for up to eight sensors per week.
Transportation	The contractor takes care of the transportation from the location of the RWS maintenance contractor for the follow-up preventive and corrective maintenance. If this maintenance is carried out outside the Netherlands, then this includes all activities and expenditure relating to international transportation.
Support	The contractor offers a service to provide support and advice to maintenance staff and RWS consultants by telephone and, in certain cases, on site. This service will be provided in the languages Dutch or English.

5 What would help RWS the most?

RWS wants a maximum involvement of the market in detailing its distinctive objectives. For this reason, aside from the requirements, we also want to share a number of underlying wishes with which we want to save costs across the entire chain in the collection of salinity data. In the process we would like to involve the market in our mission and to provide latitude to present ideas.

The application and situations described in the above chapters, can be summarized in a number of ambitions in relation to the sensor, the services and the contract to be drawn up:

- The primary maintenance period to be as long as possible.
- The follow-up maintenance period to be as long as possible.
- Initial costs for adaptation of measurement set-ups to be as low as possible.
- A reserve pool to be as small as possible, e.g. with short turnaround times for maintenance/transportation.
- The least possible amount of effort for contract management by means of the contractor providing farther-reaching relief and assurance of quality.

6 Market Consultation questions

General

- To what extent is your company interested in the assignment?
- To what extent does your company have experience with assignments or European procurement procedures for the Dutch government?
- What is the composition of your supply chain? Which parts do you purchase/what services do you outsource to suppliers or third parties?
- Is it feasible to offer a sensor which complies technically with the distinguishing requirements?
- The text mentions a number of challenges in practice: can you respond to this or do you have any suggestions?

Measurement uncertainty

- Are the specifications of measurement uncertainties verifiable? That is to say: how are the specifications of the sensor made plausible? Do you have any proof yet, is this possible with comparative measurements with a reference or something similar? In the tendering process, what is a workable way to have compliance with the specifications confirmed?
- Aside from sensor drift and fouling, are measuring performances still dependent on other matters? Can you please indicate to what extent lab conditions differ from practice outside?

Primary maintenance period

- Which aspects determine the primary maintenance period?
- Have measures been taken in the sensor design to prevent the influence of fouling? How long does it typically take to achieve intensive fouling? What term can still be guaranteed in the event of intensive fouling? How can we assess the term in a tendering process?

Follow-up maintenance period

- What is the maintenance or calibration time to guarantee operation within specifications?
- What is a typical drift specification of CT sensors?
- Is the sensor sensitive to things other than sensor drift? Obsolescence, pollution?

Innovation and Delivery Guarantee

- What innovative solutions (other than those already mentioned) do you have which could make the data collection of conductivity and temperature more cost-effective for RWS?
- To what extent can deliverability and availability of a problem-free product be guaranteed at this point in time? Is there a proven technology or innovative design?
- What service life does the product have under normal use and service?
- To what extent can the availability for delivery be guaranteed in 10 years' time, and in what way can this be guaranteed?
- Is there an innovation willingness to be more suitable for the requirements of RWS? In such case, how can initial deliverability and quality then be guaranteed in good time?

Services

- It is feasible to you to offer services which comply with the distinguishing requirements?

- Do you have a representation in the Netherlands or do you provide full services to the Netherlands?
- Can you offer a service to calibrate? Could you specifically set up this service for us? If so, how should we keep account of this in the start-up phase?
- Where would the follow-up maintenance be carried out? What turnaround times would apply?
- How would the calibration be handled technically?
- In the tendering procedure, how can we detail the method of calculation for any transportation costs abroad so that tenders are fairly comparable?

Contractual

- How will the quality of the manufactured product be assured?
- How can you safeguard the quality of service?
- For quality assurance, do you or your suppliers make use of ISO9001 certification or other certifications/standardisation?
- What added value can you or your suppliers offer in Corporate Social Responsibility, Circular Economy or Sustainability?