**Task 4.1 Calibration**

**Overview of the calibrating facility**

Contact Details

NAME/DESIGNATION (if any): National Oceanography Centre, Liverpool

MANAGING INSTITUTE/ORGANIZATION: Natural Environment Research Council

DEPARTMENT (if any):

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Part a: General Information

 1. Does your calibrating facility possess a well-defined organizational framework with

Dedicated staff? **No**

Clear hierarchy? **No**

Transparent chain of responsibility for management, technical/scientific

and operational decisions)? **No**

(If **No** to any of the above, pleaseprovide a brief description of how your facility is organized below)

NOC Liverpool does not possess an in-house calibration facility. Section 12 completed.

12. In the list of sensors below, please indicate only the ones that you currently **never** calibrate yourselves; in each case, kindly report the calibration provider (manufacturer, other) and the typical calibration interval (trimonthly, half-yearly, yearly, other) you are presently employing.

*Physical sensors for*:

 Temperature:

Sea-Bird Microcats (SBE37), SBE16+ and FSI Citadel CTD-NV. Deployed on moorings or sea bed frames for 1-2 month duration. FSI Citadel CTD-NV on ferry, turned round every fortnight. Returned to the manufacturers every 2 years for checks and calibrations. The cost and time the instruments are out of service are two very serious drawbacks to this approach.

 Conductivity (Salinity):

Sea-Bird Microcats (SBE37), SBE16+ with pumped conductivity sensors and FSI Citadel CTD-NV. Deployed on moorings or sea bed frames for 1 – 2 month duration. FSI Citadel CTD-NV on ferry, turned round every fortnight. Returned to the manufacturers every 2 years for checks and calibrations. The cost and time the instruments are out of service are two very serious drawbacks to this approach.

 Pressure:

For high quality measurements we use Digiquartz sensors mounted on a sea bed frame and do not re-calibrate them as the sensors appear to be stable for shallow water deployments.

 Dissolved oxygen:

Aanderaa optodes. Deployed on sea bed frames for 1 – 2 month duration or on ferry, turned round every fortnight. Not calibrated.

 Water Currents :

RDI ADCPs mounted on a sea bed frame for 1 – 2 month duration. In theory current speed measurement does not need re-calibrating as the measurement is a frequency shift. However, compass calibrations of instrument mounted in the sea bed frame are important.

*Optical sensors for*:

 Turbidity:

 Seapoint sensors with Zebra-Tech wipers. Deployed on sea bed frames for 1 – 2 month duration or on ferry, turned round every fortnight. Not calibrated.

***Please complete the questionnaire using the forms furnished in the following pages to provide details regarding your calibration practices for all the sensors in the above list that you do calibrate routinely*.**

**Task 4.1.1 Physical Sensors**

(\* Please provide a separate sheet for each parameter)

Part b: Calibration

Parameter/measurand\*: Temperature

Unit of measurement: °C

Range: 0 – 25 °C

Accuracy: 0.005°C

Precision: 0.001°C

Calibration uncertainty (if available):

7. In your view, is regular factory calibration/servicing necessary to obtain

optimal performances from your sensors/instrumentation for the

specified parameter/measurand in the field? **Yes**

(If **Yes**, please provide details of the sensors/instrumentation, indicating also the intervals you recommend for factory calibration/servicing, below)

Sea-Bird Microcats (SBE37), SBE16+ and FSI Citadel CTD-NV. Every 2 years.

 8. Do you perform field calibrations for the specified parameter/measurand? **No**

(If **Yes**, please provide a brief description of the method and procedures)

No, but we do check records for consistency with other moored instruments and CTD profiles.

12. Do you have any suggestions or ideas for improving the general quality

of the calibration of sensors or instruments for measuring the specified

parameter/measurand (e.g. testing and promoting the use of new

reference material, development of new methodologies, etc.)? **Yes**

(if **Yes**, please provide a brief description of your ideas and/or suggestions)

The calibration cost and the time the instruments are out of service are two very serious drawbacks to this approach.

Submitted on: 7 February 2012

 (Date)

Compiled by: John Howarth

 (Name of respondent)

**Task 4.1.1 Physical Sensors**

(\* Please provide a separate sheet for each parameter)

Part b: Calibration

Parameter/measurand\*: Conductivity

Unit of measurement: S m-1

Range: 2 – 5 S m-1

Accuracy: 0.001S m-1

Precision: 0.0001 S m-1

Calibration uncertainty (if available):

7. In your view, is regular factory calibration/servicing necessary to obtain

optimal performances from your sensors/instrumentation for the

specified parameter/measurand in the field? **Yes**

(If **Yes**, please provide details of the sensors/instrumentation, indicating also the intervals you recommend for factory calibration/servicing, below)

Sea-Bird Microcats (SBE37), SBE16+ and FSI Citadel CTD-NV. Ideally every year; in practice every 2 years.

 8. Do you perform field calibrations for the specified parameter/measurand? **No**

(If **Yes**, please provide a brief description of the method and procedures)

No, but we do check records for consistency with other moored instruments and CTD profiles.

12. Do you have any suggestions or ideas for improving the general quality

of the calibration of sensors or instruments for measuring the specified

parameter/measurand (e.g. testing and promoting the use of new

reference material, development of new methodologies, etc.)? **Yes**

(if **Yes**, please provide a brief description of your ideas and/or suggestions)

The calibration cost and the time the instruments are out of service are two very serious drawbacks to this approach.

Submitted on: 7 February 2012

 (Date)

Compiled by: John Howarth

 (Name of respondent)

**Task 4.1.1 Physical Sensors**

(\* Please provide a separate sheet for each parameter)

Part b: Calibration

Parameter/measurand\*: Pressure

Unit of measurement: dBar

Range: 0 -50 dBar

Accuracy: 0.001 dBar

Precision: 0.001dBar

Calibration uncertainty (if available):

7. In your view, is regular factory calibration/servicing necessary to obtain

optimal performances from your sensors/instrumentation for the

specified parameter/measurand in the field? **No**

(If **Yes**, please provide details of the sensors/instrumentation, indicating also the intervals you recommend for factory calibration/servicing, below)

The Digiquartz sensor appears to be stable for shallow water deployments.

 8. Do you perform field calibrations for the specified parameter/measurand? **No**

(If **Yes**, please provide a brief description of the method and procedures)

12. Do you have any suggestions or ideas for improving the general quality

of the calibration of sensors or instruments for measuring the specified

parameter/measurand (e.g. testing and promoting the use of new

reference material, development of new methodologies, etc.)? **No**

(if **Yes**, please provide a brief description of your ideas and/or suggestions)

Submitted on: 7 February 2012

 (Date)

Compiled by: John Howarth

 (Name of respondent)

 (Name of respondent)

**Task 4.1.1 Physical Sensors**

(\* Please provide a separate sheet for each parameter)

Part b: Calibration

Parameter/measurand\*: Dissolved oxygen

Unit of measurement: μM l-1

Range: 0 – 400 μM l-1

Accuracy: 5%

Precision: <1 μM l-1

Calibration uncertainty (if available):

7. In your view, is regular factory calibration/servicing necessary to obtain

optimal performances from your sensors/instrumentation for the

specified parameter/measurand in the field? **Yes**

(If **Yes**, please provide details of the sensors/instrumentation, indicating also the intervals you recommend for factory calibration/servicing, below)

Aanderaa optode.

 8. Do you perform field calibrations for the specified parameter/measurand? **Yes**

(If **Yes**, please provide a brief description of the method and procedures)

Against water samples.

12. Do you have any suggestions or ideas for improving the general quality

of the calibration of sensors or instruments for measuring the specified

parameter/measurand (e.g. testing and promoting the use of new

reference material, development of new methodologies, etc.)? **No**

(if **Yes**, please provide a brief description of your ideas and/or suggestions)

Submitted on: 7 February 2012

 (Date)

Compiled by: John Howarth

 (Name of respondent)

**Task 4.1.1 Physical Sensors**

(\* Please provide a separate sheet for each parameter)

Part b: Calibration

Parameter/measurand\*: Current

Unit of measurement: m s-1

Range: 0 – 2 m s-1

Accuracy: <0.01 m s-1 (Depends on instrument set up – number of pings, bin length, ...)

Precision: <0.01 m s-1

Calibration uncertainty (if available):

7. In your view, is regular factory calibration/servicing necessary to obtain

optimal performances from your sensors/instrumentation for the

specified parameter/measurand in the field? **No**

(If **Yes**, please provide details of the sensors/instrumentation, indicating also the intervals you recommend for factory calibration/servicing, below)

In theory ADCPs do not need re-calibrating as the speed measurement is a frequency shift, but see the comment in 12 below regarding the compass.

 8. Do you perform field calibrations for the specified parameter/measurand? **Yes**

(If **Yes**, please provide a brief description of the method and procedures)

Check for consistency in calculated tidal currents.

12. Do you have any suggestions or ideas for improving the general quality

of the calibration of sensors or instruments for measuring the specified

parameter/measurand (e.g. testing and promoting the use of new

reference material, development of new methodologies, etc.)? **Yes**

(if **Yes**, please provide a brief description of your ideas and/or suggestions)

The accuracy is dependent on the compass – calibration of the instrument mounted in the sea bed frame is advisable.

Submitted on: 7 February 2012

 (Date)

Compiled by: John Howarth

 (Name of respondent)

**Task 4.1.1 Optical Sensors**

(\* Please provide a separate sheet for each parameter)

Part b: Calibration

Parameter/measurand\*: Turbidity

Unit of measurement: FTU

Range: 0 – 125 FTU

Accuracy: <2%

Precision: 0.1 FTU

Calibration uncertainty (if available):

7. In your view, is regular factory calibration/servicing necessary to obtain

optimal performances from your sensors/instrumentation for the

specified parameter/measurand in the field? **No**

(If **Yes**, please provide details of the sensors/instrumentation, indicating also the intervals you recommend for factory calibration/servicing, below)

Seapoint turbidity sensor

 8. Do you perform field calibrations for the specified parameter/measurand? **No**

(If **Yes**, please provide a brief description of the method and procedures)

We have checked the sensor against standard solutions in the laboratory.

12. Do you have any suggestions or ideas for improving the general quality

of the calibration of sensors or instruments for measuring the specified

parameter/measurand (e.g. testing and promoting the use of new

reference material, development of new methodologies, etc.)? **No**

(if **Yes**, please provide a brief description of your ideas and/or suggestions)

Submitted on: 7 February 2012

 (Date)

Compiled by: John Howarth