1. IMCA Telemetry Device

Revision History			
Revision	Date	Author	Comments
1	November 9, 2011	G Wright	Initial draft
1	March 26, 2012	G Wright	Add C-O feature
1	October 12, 2012	G. Wright	Documented C-O for Elevation
1.1	May 11, 2015	G. Wright	Updated figure and refined description of shift options
1.2	August 24, 2020	G. Wright	Added Stale Data option
2.0	February 6, 2024	S. Westaway	Device Updated

1.1 Overview

The IMCA Telemetry device supports the IMCA Telemetry standard as defined by the IMCA document, *Inter-Vessel Survey Data Standard Telemetry Protocol IMCA S 006 Rev. 1, April 2003*.

1.2 Data Types

The device supports the following data types:

- **P Positioning**
  - Geographic 2D position
  - Height (published as an Elevation observation)
  - standard deviation (latitude and longitude standard deviations)
  - position source
  - position status
- **K Stationing**
  - Line name
  - KP
  - Distance cross course
- **H Heading (True)**
- **R Attitude**
  - Pitch
  - Roll
- **D Bathy**
  - Water depth
  - Altitude
- **B Depth of Burial**
- **A Acoustic**
  - Beacon ID or Address
  - Number of ranges (LBL Acoustics)

- Standard deviation
- RMS

- **T Tow**
  - Tension
- **M Message**
  - ASCII Message
- **A Auxiliary**
  - Data not previously defined as above

1.3 Message Validation

The messages are NMEA-like and as such are checked for only NMEA valid characters as the first step of data validation. If any non-compliance is detected, the message is not processed further.

All messages by definition include a NMEA-like checksum. If the checksum is present, it is checked, and the message is only processed further if it passes. If the checksum is not present, the message processing continues as if one was present, and it passed.

1.4 Units

All distances in message are output in metres and all angles in message are output in degrees regardless of local units. Local units are applied within receiving package. Time in message is UTC.

1.5 Identifiers

The message is identified by the IDs field. This field is used by NavView to identify and associate the respective data as sources for Calculations.

Figure 1 ID Field - Position and Heading Identifier

1.6 Output

The implementation of this device does not support output of the general messages nor anchor messages.

1.7 Observations

The IMCA device supports the following observation types as obtained from the respective message type. Note that all will appear for selection in the respective dialogs, even if not available.

- Geographics2D Position: Positioning message (P) – Body State

- Heading: Heading message (H) – Body State
- Pitch/Roll: Attitude (R) – Body State
- Route Guidance: Stationing (K) – Line Name, KP, DCC
- Elevation: Positioning (P) – Body State
- Force: Tension (T)
- Altitude/Depth: Bathy (D)
- Burial: Burial (B)

1.8 Operation

The IMCA Telemetry device supports inputs from multiple sources, i.e. vessels. These sources are determined from the description field in the message. NavView maintains a list of the vessels for which messages are received. When a message is received, once it passes validation, the description field is checked and if the source is not already on the list, it is added. The message is then decoded and the observations for the data present are published. Note that sources are not automatically removed from the list under any circumstances.

Note: Message descriptions containing only numbers and/or decimal places are acceptable and used if manually entered as part of the configuration but are not automatically added due to the potential for them resulting from a misaligned time field.

Note: **Station** needs to be set to **Active** to enable broadcast of device message.

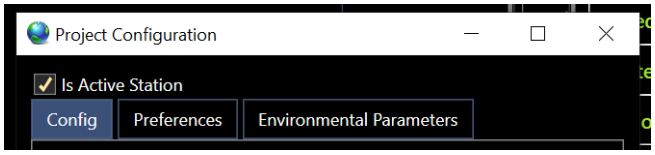

Figure 2 Project Configuration _ Active Station Setting

1.9 Add Device

1. Select Devices from the Configuration section of the Setup ribbon to open the IO Devices window.
2. Select Configurable Output in the drop-down list, see Figure 3

Figure 3 IO Devices Window

3. Click the add  button, this will open the Configure Device I/O dialog, see Figure 4

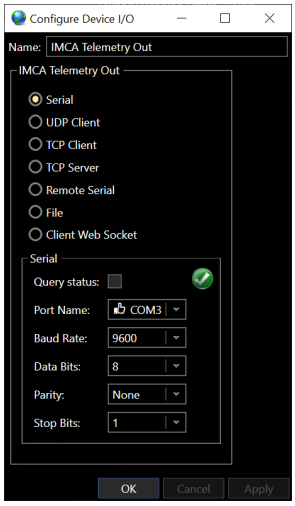

Figure 4 Configure Device I/O

4. Configure I/O as required. Refer to *Device* section in the NavView User Guide for I/O configuration.
5. Click **Okay**.

1.10 Configure Device

1. Click the configure device  button to open Configure IMCA Telemetry dialog, see Figure 5

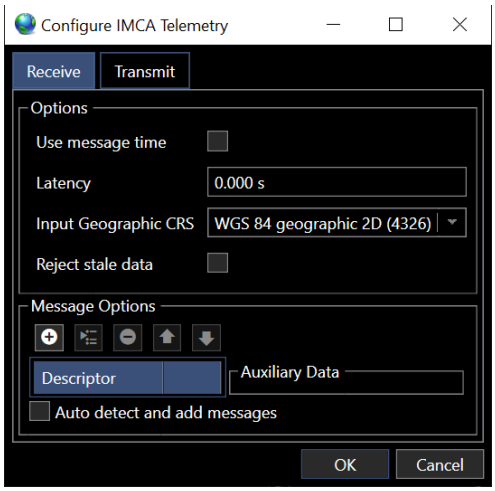

Figure 5 Configure IMCA Telemetry

2. Select Receive Tab or Transmit Tab for configuration.

Note: Data can be transmitted and received on the same IMCA Telemetry device.

1.10.1 Transmit Tab Configuration

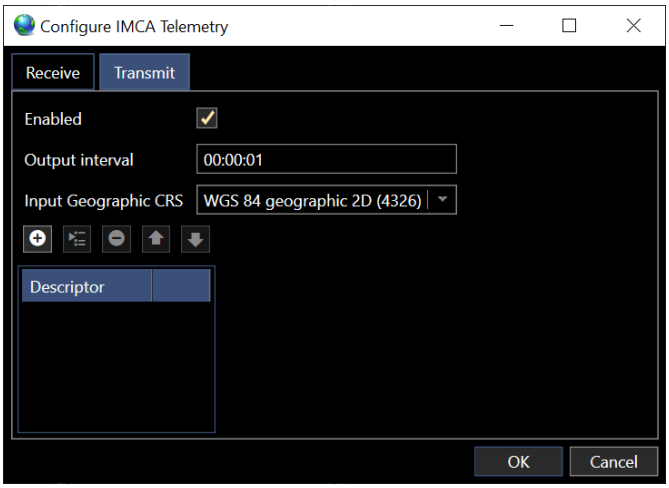

Figure 6 Transmit Tab

1.10.1.1 General Settings

- **Enable:** Check the box to enable the device

Note: Station needs to be set to **Active** to broadcast device message.

- **Output interval:** Enter output interval, i.e. second entered as 00:00:01
- **Input Geographic CRS (Output):** Select the 2D Geographic CRS to be used in output message

1.10.1.2 Message Descriptions

The message Descriptor is used to identify what the data is referred to, i.e. Vessel CRP.

1. Click the Add button to add a row to the data grid to allow entry of a new description.

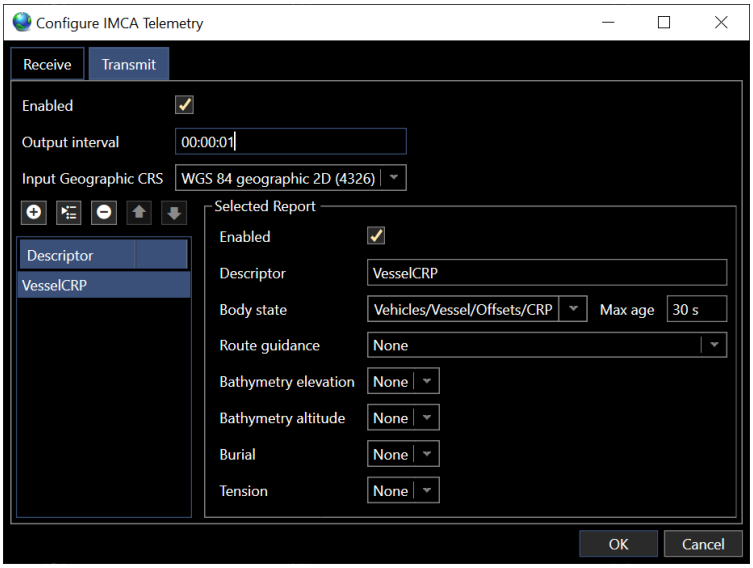

Figure 7 Message Description Dialog

2. Multiple **Descriptors** can be added to the device. Check the **Enabled** box to activate the Selected Report.
3. In the **Descriptor** field enter a description that will be added to the message that will be used to identify the selected report.
4. Select what data will be added to the message.
    - **Body State:** From the drop-down menu select the vehicle data to output.
        - **Output:** Position, Heading, Elevation and Attitude (Pitch and Roll)

Note: Max age is used to reject stale data based on the value entered.

- **Route Guidance:** From the drop-down menu select a route guidance that has been created in Guidance Calculations
    - **Output**: Station (KP), Line Name and DCC(m)
- **Bathymetry Elevation:** Options available are Contant or Observation
    - **Output**: Elevation(m)
- **Bathymetry Altitude:** Options available are Constant or Observation
    - **Output**: Distance(m)
- **Burial:** Options available are Constant or Observation
    - Output: Burial Depth(m)
- **Tension:** Options available are Constant or Observation
    - Output: Force(kN)

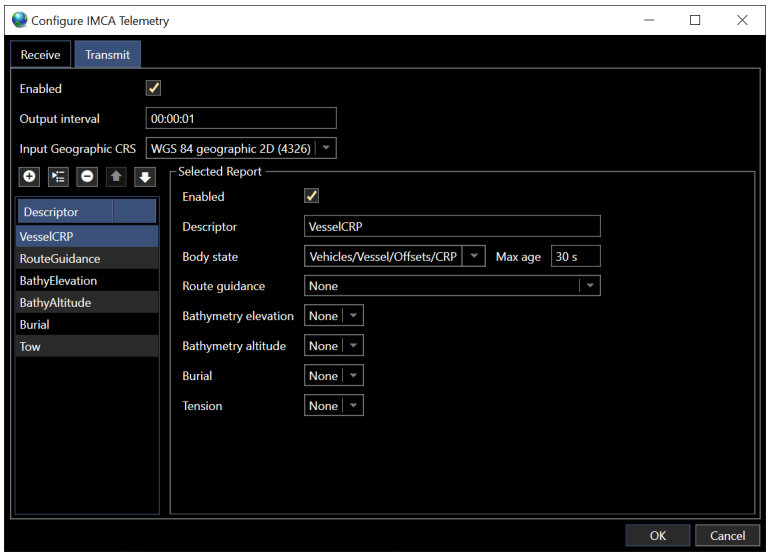

Figure 8 IMCA Telemetry Transmit Configuration Example

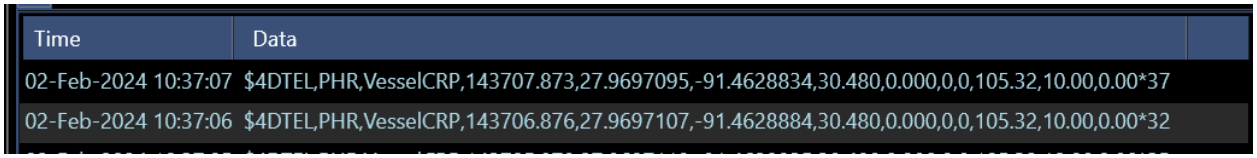

Figure 9 IMCA Telemetry Transmit Message Example

1.10.2 Receive Tab Configuration

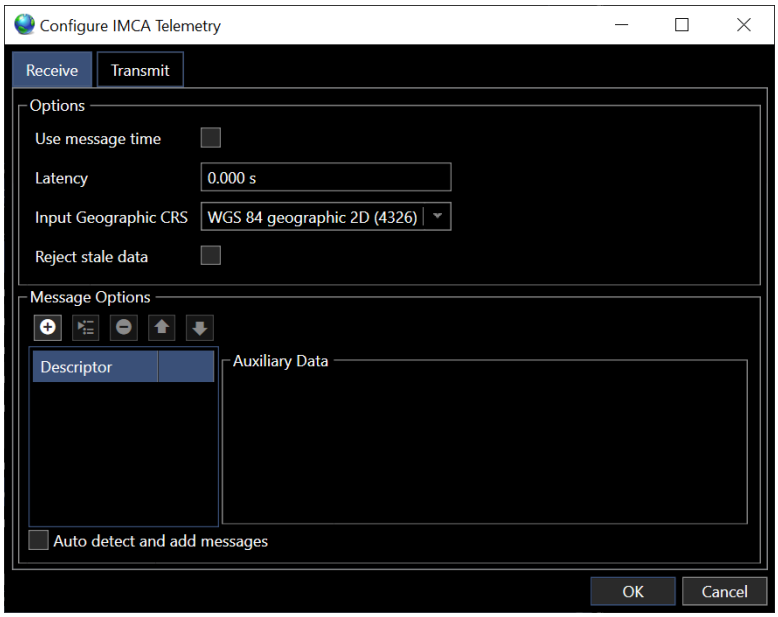

Figure 10 Receive Tab

1.10.2.1 General Settings

- **Use Message Time:** Check this box to use the UTC time in the message as the data timestamp. Leave this box unchecked if the message is to use the NavView system time as the data timestamp
- **Latency:** If the **Use message time** box is unchecked, a known latency can be entered to be applied to the system time the message is received for the data time stamp
- **Input Geographic CRS:** Select the 2D Geographic CRS in the message
- **Reject Stale Data:** Check the box to reject data that does not change,

1.10.2.2 Message Options

1. Click the Add button to add a row to the data grid to allow entry of a new **Descriptor**, see Figure 11.
2. Enter the Descriptor to be detected and decoded. The entry must be exactly the same as it appears in the message.

Note: If **Auto detect and add messages** is selected, the device will read the Descriptor in the incoming message then add it to the list for use.

3. The decoded data can be used in Calculations, see Figure 12.

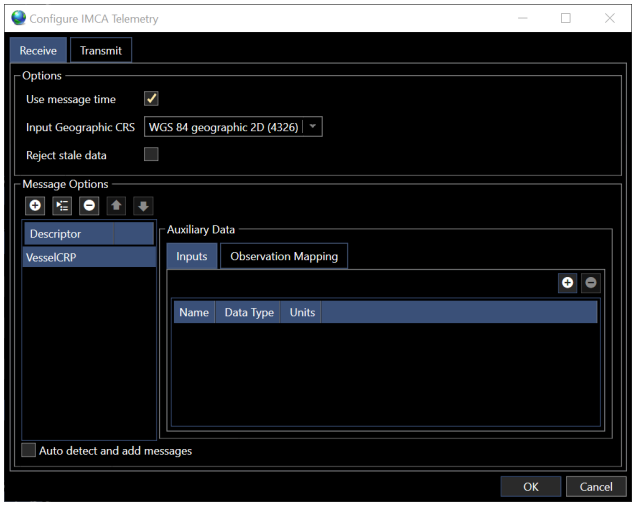

Figure 11 Descriptor Added

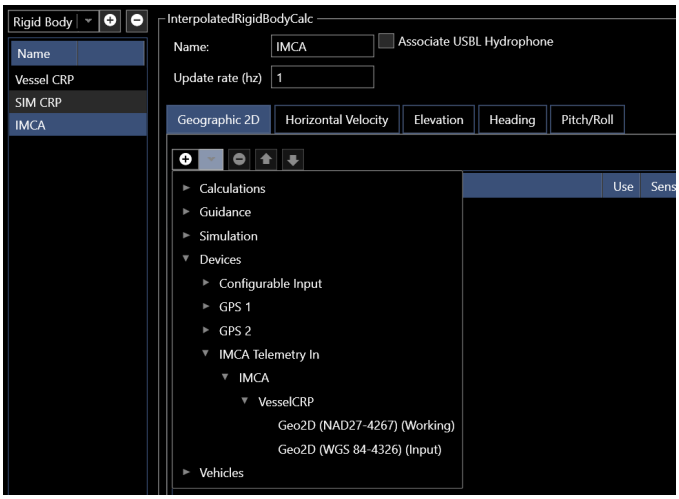

Figure 12 IMCA Device Data Available

1.10.2.3 Auxiliary Data

Auxiliary Data is used to decode data contained in the IMCA message that is not a previously defined data type.

Use of this would depend on the users at both ends knowing what was being passed and in what order.

As an example an IMCA message received contains **Tow** Tension data which is a previously defined data type and also contains auxiliary data from a cable counter CC1 which is not a previously defined data type.

Note: Refer to document *Inter-Vessel Survey Data Standard Telemetry Protocol IMCA S 006 Rev. 1, April 2003* for auxiliary message format, see Figure 13.

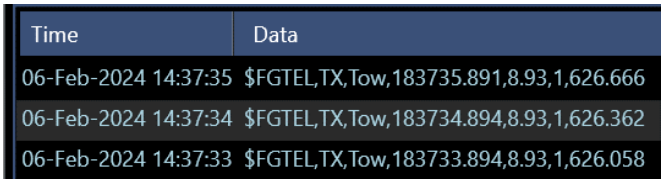

Figure 13 IMCA Message Containing Auxiliary Data

To define the cable counter CC1 data type to be available as an observation;

1. Select the **Inputs** tab to define the CC1 data type.

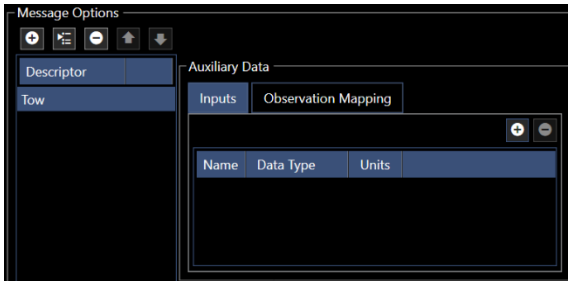

Figure 14 Auxiliary Data – Inputs Tab

2. Click the Add button to add a data type definition. In this example we want to define CC1.

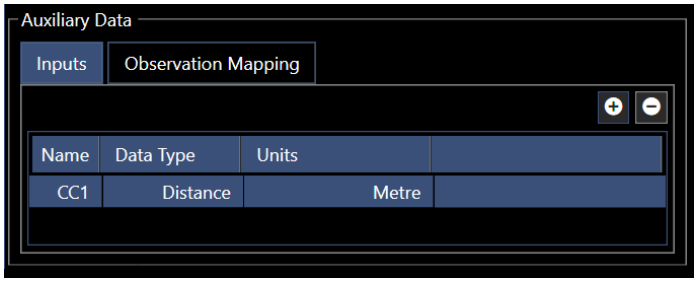

Figure 15 CC1 Data Type

   a. Enter Name for the data type definition
   b. Select the data type, in this example it is Distance
   c. Select the units as it is in the message string, this will be converted to local units

Note: If the message string contains more than one auxiliary data, add the data types in the **Inputs** tab in the order they appear in the message string.

3. Select the **Observation Mapping** tab to configure the data type definition.

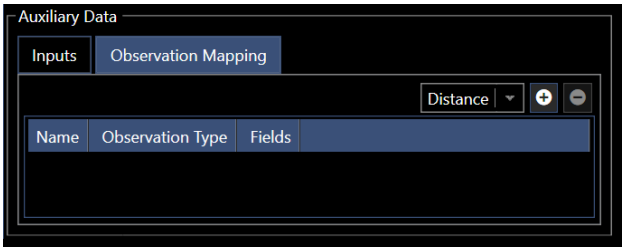

Figure 16 Observation Mapping Tab

a. From the drop-down menu select the item, in this example Distance is selected, then click the Add button to add to the list

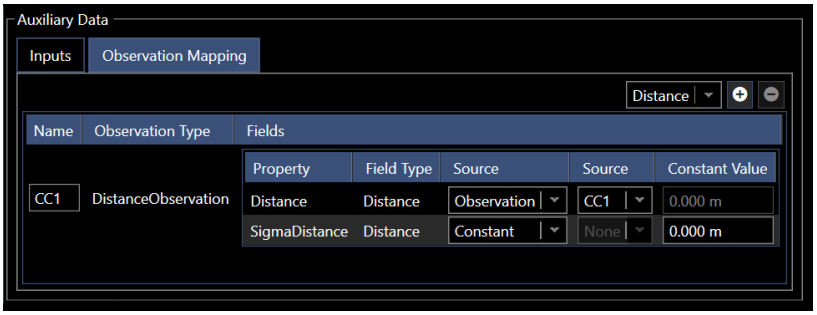

Figure 17 Auxiliary Data Type Configuration

b. Enter Name of the defined data as it will appear in Observations
c. Select if the data is from an Observation or a Constant from the drop-down menu
d. Select the Source from drop-down menu, this is taken from data type definitions added in the Inputs tab

4. The cable counter CC1 data will now be available, see Figure 18

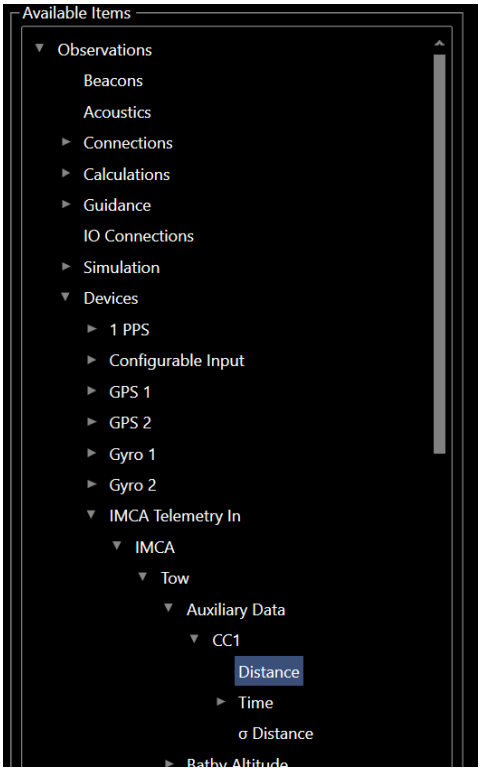

Figure 18 Auxiliary Data - CC1