

<b>WinFrog Device Group:</b>	<b>Range/Range</b>
<b>Device Name/Model:</b>	<b>Trisponder 540</b>
<b>Device Manufacturer:</b>	<b>DEL NORTE Technology Limited</b> Unit 30, Shrivenham Hundred Business Park Watchfield, Swindon, Wiltshire, SN6 8TZ, UK  Tel: +44 (0)1793 784487 Fax: +44 (0)1793 784409 E-mail: <a href="mailto:mail@del-norte.co.uk">mail@del-norte.co.uk</a>
<b>Device Data String(s) Output to WinFrog:</b>	
<b>WinFrog Data String(s) Output to Device:</b>	
<b>WinFrog Data Item(s) and their RAW record:</b>	N/A

#### **DEVICE DESCRIPTION:**

Trisponder is a family of short and medium range microwave and UHF positioning systems which use the time difference technique to measure ranges between user vessels and up to eight shore stations. In addition to displaying measured ranges the system also computes vessel position by trilateration and provides guidance information to the vessel's helmsman.

The system is comprised of two elements, the vessel equipment and the shore equipment. The vessel equipment includes a control unit and a Master transponder, while the shore stations include a Remote transponder together with a suitable power supply. The vessel control unit (Digital Distance Measuring Unit (DDMU)) initiates range measurements by instructing the Master transponder to transmit a set of coded interrogation pulses. All remote stations receive the interrogation pulses, but only the one that recognizes its own unique code replies to the interrogation. The reply is received back at the master transponder and the DDMU then computes the range from the time difference measurement (based on a constant velocity for the propagation of Radio waves through the atmosphere). Each remote station is interrogated in turn until all ranges have been measured, and up to twelve DDMU's can use the chain of deployed Remote stations at the same time thus enabling full multi-user operation.

Accuracy of range measurements is typically  $\pm 1$  metre out to the system's maximum line of sight range of 80 Kilometres, and the measurement resolution is 0.1 metre. To compensate for small variations in the timing circuits of the Remote transponders, the system must be calibrated before use. This is a simple process where the system is set up with the Master transponder and Remote transponders a known distance apart (at least 2 Km). The range between the Master and each of the Remotes is then measured in turn and compared with the true range to arrive at a 'Calibration factor' for each Remote unit. This calibration factor is entered into the DDMU with the remainder of the

Remote station data (code, position, height, etc.) and is automatically applied to all range measurements to the remote.

WinFrog replaces the internal calculation routines combining the raw ranges received from the transceiver unit with internally configured control station coordinates to calculate the final position. This requires that the operator must create a Working Control Stations (.cls) file. See chapter 13 of the WinFrog User's Guide for more details on the setup and use of Range/Range devices.

## ***DEVICE CONFIGURATION INSTRUCTIONS***

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### **WINFROG I/O DEVICES > EDIT I/O:**

Serial

Configurable Parameters

### **WINFROG I/O DEVICES > CONFIGURE DEVICE:**

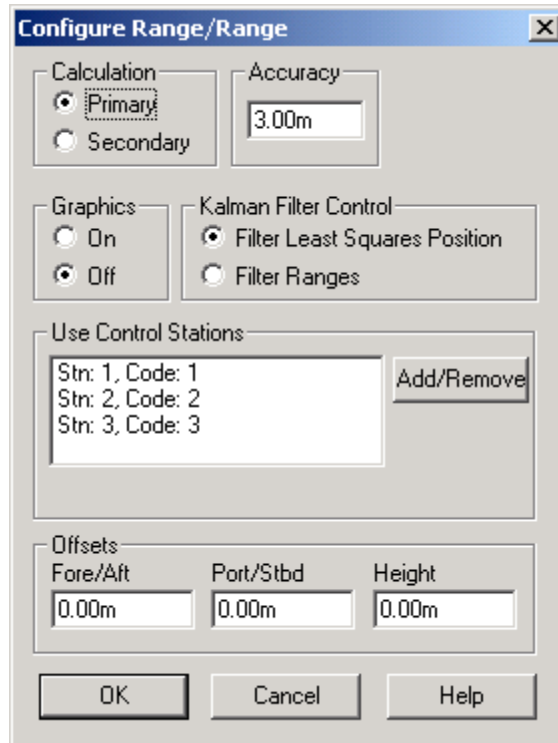
No configuration is required at the I/O Device window level.

### **WINFROG VEHICLE > CONFIGURE VEHICLE DEVICES > DEVICE DATA ITEM > EDIT:**

Adding the Trisponder 540 device creates the RANGE/RANGE data item. Once the data item has been added to the vehicle, it must be edited to suit the application.

**Data item: RANGE/RANGE, Trisponder 540, RANGE/RANGE**

Highlight the Trisponder RANGE/RANGE data item in the vehicle's device list and click the Edit button to display the Configure Range/Range dialog box as seen below.



### **Calculation:**

Set the calculation to Primary if the position calculated from the Trisponder device is to be the primary positioning data source. Set to Secondary if the position calculated from this device is to be monitored.

Note that in case of Primary device failure WinFrog will not automatically revert to Secondary devices. You must manually change a device from Secondary to Primary.

### **Accuracy:**

You can enter a realistic accuracy for the device. For the Trisponder device, the default of 3 meters is recommended for properly calibrated equipment.

### **Graphics:**

Setting this option to On will plot a square in the Graphics and Bird's Eye windows at the calculated location of the onboard transponder.

### **Kalman Filter Control:**

The Kalman filter control option allows you to select how Kalman filtering will be applied to the data.

The **Filter Least Squares Position** option calculates a position using a least squares adjustment of the raw ranges. This calculated position is then put into the Kalman filter. The **Filter Ranges** option enters the raw ranges into the Kalman filter before they are used to calculate a position. The Filter Ranges option is the recommended option for most applications.

**Use Control Stations:**

In order for WinFrog to be able to utilize a received range it must be able to match the code from the received range data string to the control station code setup in the working .cls file as mentioned above. Clicking on the **Add/Remove** button displays the list of available control stations. You can then select/deselect the appropriate control stations by using the Add or Remove buttons.

**Offsets:**

Offsets are applied similar to other devices in WinFrog. They are measured from the CRP of the vessel to the onboard transponder. A sensor height relative to Mean Sea Level (MSL) must be entered in the Height dialog box. This value is used in conjunction with the MSL Elevation values entered in the .cls files to reduce the ranges to the horizontal.