WinFrog Device Group:	**ROV**
Device Name/Model:	**TSS340**
Device Manufacturer:	**TSS (UK) LTD HQ** New Mill New Mill Lane, Witney Oxfordshire, UK OX8 5TF Tel: +44 (0)1993 777700; Fax: +44 (0)1993 777701 Email: tssmail@tssuk.co.uk http:// www.tss-realworld.com **USA Branch** 10801 Hammerly Blvd Suite 206 Houston Texas 77043 Tel: +1 713-461-3030**;** Fax: +1 713-461-3099 Email: tssusa@tssusa.com
Device Data String(s) Output to WinFrog:	Time (computer), Lateral Offset, Vertical Distance, Altitude, Depth of Cover, Signal Strength (Ch1), Signal Strength (Ch2), Signal Strength (Ch3), Signal Strength (Ch4), Data Packet Identifier, QC check code, flag (SET or RESET). See configuration details.
WinFrog Data String(s) Output to Device:	Nil
WinFrog .raw Data Record Type(s):	Type 493

DEVICE DESCRIPTION:

The TSS 340 Pipe Tracker is capable of providing position and depth of cover data, for pipelines and cables, in real time. This sub-sea system is used for detecting ferrous and non-ferrous metals on or beneath the seabed during installation, burial and survey operations. The unit does not require calibration during or after installation.

The 340 tracks using 'pulse induction' technology. This classifies the system as an 'active detection and tracking system'. In addition to pipeline and cable surveys, the TSS 340 has also been employed on site and debris clearance projects, CP surveys and dredging operations.

The system consists of two subsea electronic pods (SEP's), coils and an altimeter – normally mounted on a subsea vehicle; and a surface display computer (SDC) mounted on the survey vessel. The subsea elements can be mounted on larger ROV's. The SDC provides an external logging output and a graphical representation of steerage information to the vehicle pilot. This gives the position of the target relative to the search coils.

DEVICE CONFIGURATION INSTRUCTIONS:

Between SDC and WinFrog:

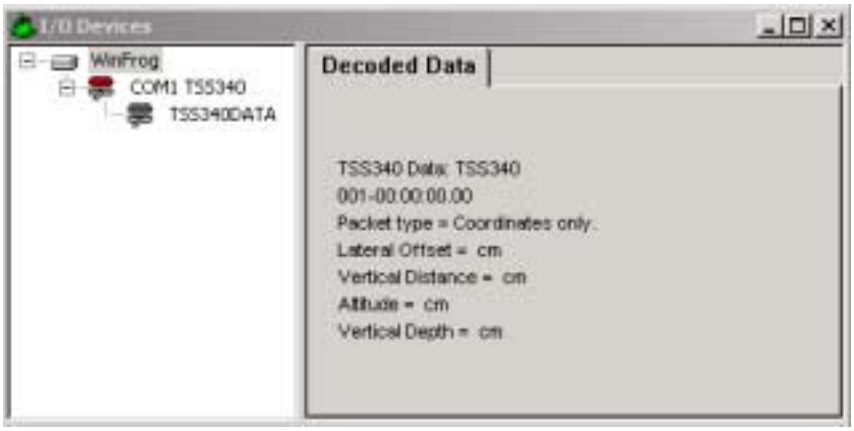
Baud Rate:	9600
Data Bits:	8
Stop Bits:	1
Parity:	ODD

Between SEP and SDC:

Baud Rate:	9600
Data Bits:	8
Stop Bits:	1
Parity:	None

The above are RS232 communications. For the 20mA digital current-loop (two-wire twisted pair) communication between the SEP and SDC, refer to the TSS 340 System Manual. An alternative for distances greater than 1000 meters; is to use the 4-wire twisted pair method, which is also described in the System Manual.

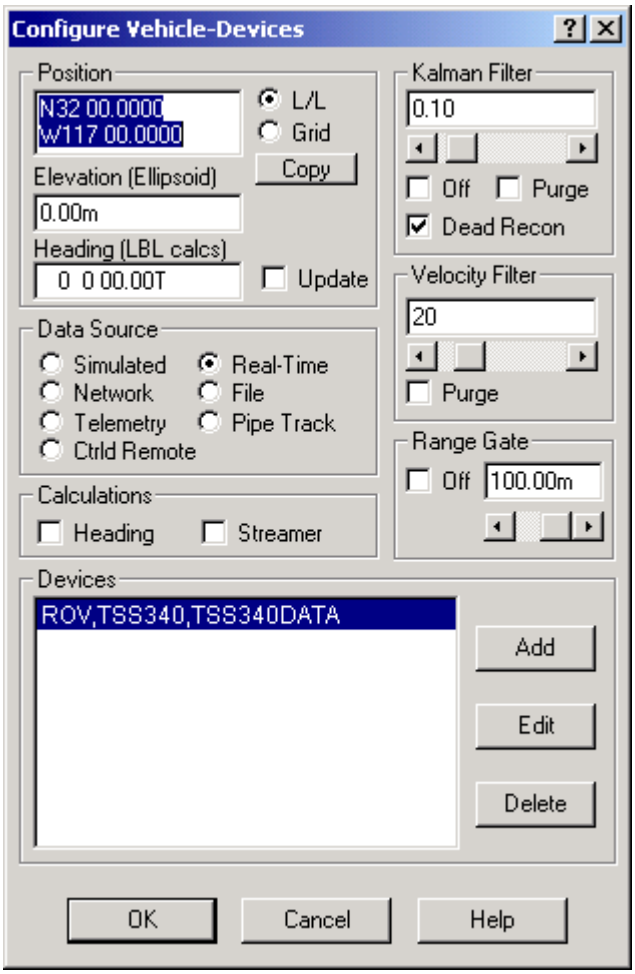
WINFROG I/O DEVICES > CONFIG OPTIONS:
The TSS340 is added to WinFrog from the ROV device types. The TSS340DATA data item is added to the system along with the TSS340 device.



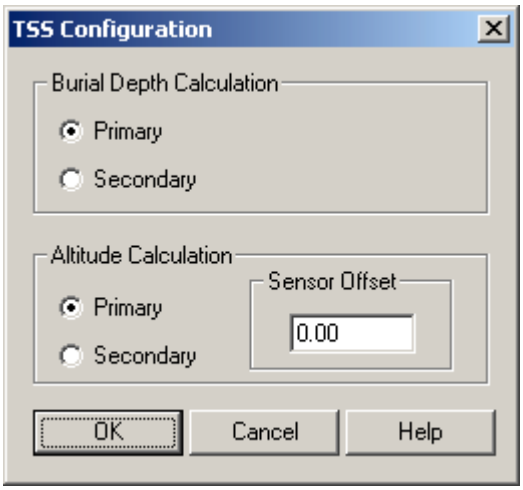
No configuration is required or available at the I/O Device level.

WINFROG VEHICLE TEXT WINDOW > CONFIGURE VEHICLE DEVICES > DEVICE > EDIT OPTIONS:

The TSS340DATA data item can be added to the vehicle (usually ROV). This will initiate the logging of the type 493 record in the RAW data files.



The **TSS340DATA** data item must be edited once it is added to a vehicle's device list. Highlight the **ROV, TSS340,TSS340DATA** data item in the vehicle's device list, then select the **Edit** button. The TSS Configuration dialog box appears as seen below.



Burial Depth Calculation:

Set the **Calculation** selection to **Primary** or **Secondary.** Devices set to **Primary** calculation are used to provide a burial depth. Note that more than one burial depth device can be added to a vehicle's device list; in this situation only one burial depth device may be set to Primary. If the **Calculation** type is set to **Secondary**, WinFrog will simply monitor the device's data. WinFrog will not associate the burial depth data from the device with the vehicle; the data will only be logged to the raw data files.

Note: In the case of **Primary** device failure, WinFrog will not automatically use the **Secondary** devices for the vehicles burial depth computation. You must manually change a **Secondary** device to **Primary** in order for the data to be utilized.

Altitude Calculation:

Set the **Calculation** selection to **Primary** or **Secondary.** Devices set to **Primary** calculation are used to provide an altitude. Note that more than one altitude device can be added to a vehicle's device list; in this situation only one altitude device may be set to Primary. If the **Calculation** type is set to **Secondary**, WinFrog will simply monitor the device's data. WinFrog will not associate the altitude data from the device with the vehicle; the data will only be logged to the raw data files.

Note: In the case of **Primary** device failure, WinFrog will not automatically use the **Secondary** devices for the vehicles altitude computation. You must manually change a **Secondary** device to **Primary** in order for the data to be utilized.

The **Sensor Offset** is the vertical distance from the CRP to the TSS sensor (up is +ve, down is –ve).

CONFIGURATION DETAILS:
The TSS340 should be mounted as per the instructions in the System Manual.

Output Rate:
Data can be transmitted, to the data logger, at a rate of either four or one record per second. This rate is set via the SDC.

TSS340 Output Format:
The 340 can output coordinate data, or the coordinate data and the signals data. If the system is set to output coordinate data only, the signal strength fields (in the record) will be empty, and separated by comma's. Following is the Data Packet Format output from the TSS340:

:TQ±aaa_bbb_ccc±ddd±11111±22222±33333±44444_XX<CR><LF>

Field	Definition
:	Start of Packet Character
T	Identifier for the Data Packet. The 'T' identifies a coordinate and signals packet. This identifier is after the signal strengths in the RAW data string (type 493). This may be identified by the number 84.
Q	Quality Control Flag. This is either a space when RESET, or a '?' when SET. Refer to the last item in the WinFrog type 493 data string for either 'SET' or 'RESET'
±**aaa**	Lateral offset from the centre of the coil array to the top of the target. '+' means the target is to starboard, '-' means the target is to port, ??? means the target is out of range.
bbb	The vertical distance from the bottom of the coil array to the top of the target. If a weight coating thickness, using 'Target Scaling', is entered then the vertical distance displayed and logged by the 340 will be to the top of this coating. Otherwise, the distance is to the top of the conductive part of the target. ??? means: • The target is out of range, or, • The system has been unable to compute an accurate position, or, • Coil saturation has occurred.
ccc	This is the attitude data provided by the altimeter, if one is connected. Alternatively, the field may contain the fixed height above the seabed depth if the system has been configured with this information. ??? means that no fixed height or altimeter data is available.
±**ddd**	The vertical depth of cover to the top of the target. If applicable, allowance will be made for the thickness of any weight coating so that ±**ddd** will be the depth of cover to the top of the coating. '+' means that the target is buried. '-' means that the target is exposed.

	??? means: • The target is out of range, or, • The system has been unable to compute an accurate position, or, • Coil saturation has occurred, or, • No information is available regarding the height of the vehicle above the seabed.
±**11111**	Signal Strength on channel 1 (starboard channel) in microvolts.
±**22222**	Signal Strength on channel 2 (center channel) in microvolts.
±**33333**	Signal Strength on channel 3 (port channel) in microvolts.
±**44444**	Signal Strength on channel 4 (redundant channel) in microvolts.
XX	The Quality Control Check Code: **00** Target in Range, signals on center coil ≥50μV, lateral offset of target is **<**±90cm. Quality Flag is **RESET.** **01** Target in Range, signals on center coil **<**50μV, lateral offset of target is **<**±90cm. Quality Flag is **SET.** **02** Target in Range, signals on center coil ≥50μV, lateral offset of target is **>**±90cm. Quality Flag is **SET.** **03** Target in Range, signals on center coil <50μV, lateral offset of target is **>**±90cm. Quality Flag is **SET.** **04** Target in Range but system is unable to compute an accurate position; or, coil saturation. **99** Target out of Range.
<CR><LF>	Carriage return and line feed

Note: All distances are logged in units of centimeters.

Following is a WinFrog data string (493) without the system sending data to WinFrog:

493,TSS340,0.00,,,,,0,0,0,0,

Following are WinFrog data strings (493) with an operational TSS340 system sending data to WinFrog:

493,TSS340,931530704.663, 192, 023, +169, +052, 57, 55, 37, -1,84,0,RESET

493,TSS340,931478395.813, ???, 033, +???, +???, -5, -15, -1, -2,84,99,SET