WinFrog Device Group:	**GPS**
Device Name/Model:	**NR103 Pseudo (NR203 Pseudo)**
Device Manufacturer:	**DSNP** (Dassault Sercel) 16, rue de Bel-Air – B.P. 433 44474 CARQUEFOU CEDEX, FRANCE Tel: 33 2 40 30 59 00 Fax: 33 2 40 30 58 92 E-mail: Info-DSNP@DSNP.com
Device Data String(s) Output to WinFrog:	Position (GPGGA), Pseudo-range, Ephemeris, DGPS Corrections (RTCM)
WinFrog Data String(s) Output to Device:	N/A
WinFrog .raw Data Record Type(s):	Type: 303

DEVICE DESCRIPTION:
Due to the age of (and lack of documentation for) the NR103 GPS receiver, this document is based on information pertaining to DSNP's newer NR203 model. WinFrog will accept both Sercel NR103 and NR203 data using this driver.

The NR203 is a 15 parallel channel DGPS Receiver that also contains a 4 channel multi-frequency, multi-station correction receiver capable of processing differential messages from a variety of (weighted) sources including the following:

- DSNP NDS200 HF station
- DSNP NDS100 UHF Station
- IALA Radio beacon
- Any RTCM104 compatible DGPS system.

The NR203 can utilize up to 4 correction sources to result in a single Multiple Reference station position solution.
Features of the instrument include; PPS output, event trigger, raw data output and use of advanced correlation technology. The unit is supplied with a GPS antenna and an integrated RF antenna, which can receive HF and MF differential signals.

DSNP NR203

WinFrog can be configured to utilize both the internally calculated (GGA) position, or to use the raw pseudorange and ephemeris data to internally calculate its own position.

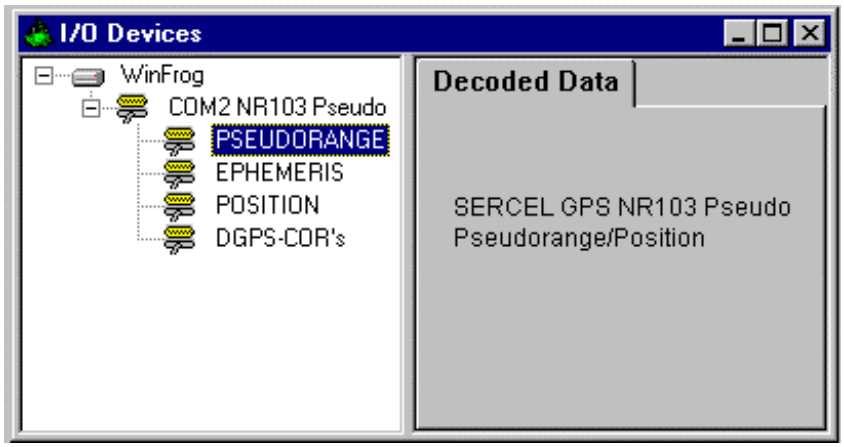
DEVICE CONFIGURATION INSTRUCTIONS:
The NR203 is configured with 1 RS232 I/O port, 2 RS422 I/O ports, 1 RS232 DGPS input port, and 1 RS422 DGPS input port. Each of these ports can be configured for Baud Rate, Data bits, Stop Bits and Parity as required.

Operation with WinFrog requires interfacing only the single RS232 I/O port.

Baud Rate: Configurable up to 19600 Baud (RS-232 I/O port)
Data Bits: Configurable
Stop Bits: Configurable
Parity: Configurable

WINFROG I/O DEVICES > CONFIG OPTIONS:
The NR103 Pseudo is added to WinFrog from the GPS device category. As seen below, adding the NR103 device provides WinFrog with 4 separate Data items: Pseudorange, Ephemeris, Position and DGPS COR's.

No device configuration is available or required within this window.



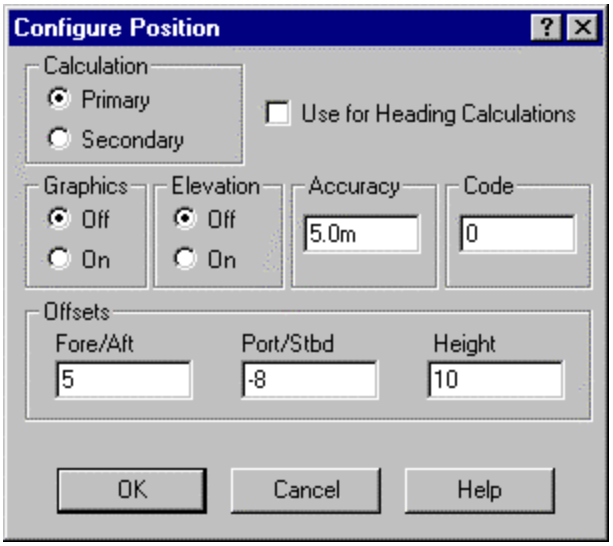
WINFROG VEHICLE - DEVICES > EDIT OPTIONS:
You are provided with three options when adding NR103 data to a vehicle's device list.

1) You can add the NR203 derived NMEA format position (GPS, NR103 Pseudo, POSITION) data item. Remember that the NR103/NR203 can be configured to calculate and output a multiple reference solution to WinFrog.

2) You can add the raw Pseudorange, Ephemeris and RTCM data items to the vehicle's device list and have WinFrog calculate a Multi-Ref solution internally.

3) You can add both 1 and 2 from above.

Configure GPS, NR103 Pseudo, Position:
If the NR103/NR203 Position data item has been added to a vehicle's device list, you must edit the device to suit the application. In the Configure Vehicle-Devices dialog window, highlight the GPS, NR103 Pseudo, POSITION data item, then click the Edit button. The Configuration Position window, as seen below, now appears.



The following items are available for configuration:

Calculation:
Select either Primary or Secondary radio button. Devices set to Primary calculation are used in the Kalman filter to produce a vehicle position. If more than one positioning device added to the vehicle's device list is deemed as primary, WinFrog will weight them based on the accuracy value entered. Devices with a higher accuracy values (i.e. lower entered value) will be weighted higher. If a positioning device's calculation is set to Secondary, WinFrog will not use the position data in of the vehicles' position solution; that device's position will simply be received and monitored. Note that in the case of Primary device failure, WinFrog will not automatically use the Secondary devices for the vehicle position computation. Instead, it will start dead reckoning (if dead reckoning is turned on). You must manually change a secondary device to primary status if you want to utilize the data coming from that device.

Accuracy:
The Accuracy value is the expected accuracy (i.e. standard deviation) of the positioning device. This value is used in the weighting of this device relative to other primary positioning devices, and in the vehicle's Kalman filtering. The default values should be changed only if you have confidence that newly entered accuracy values are more correct than the default values.

You must also be cautious of setting both a Multi-Ref position and a single source DGPS position as primary positioning devices. This will weight the single position equal to the 5 positions combined to create the Multi-Ref position.

Use For Heading Calculations:
Select this checkbox if this GPS position is to be used in conjunction with another GPS device for determination of the heading of the vessel. The vessel's heading will be derived by the inverse of the GPS antenna coordinates.

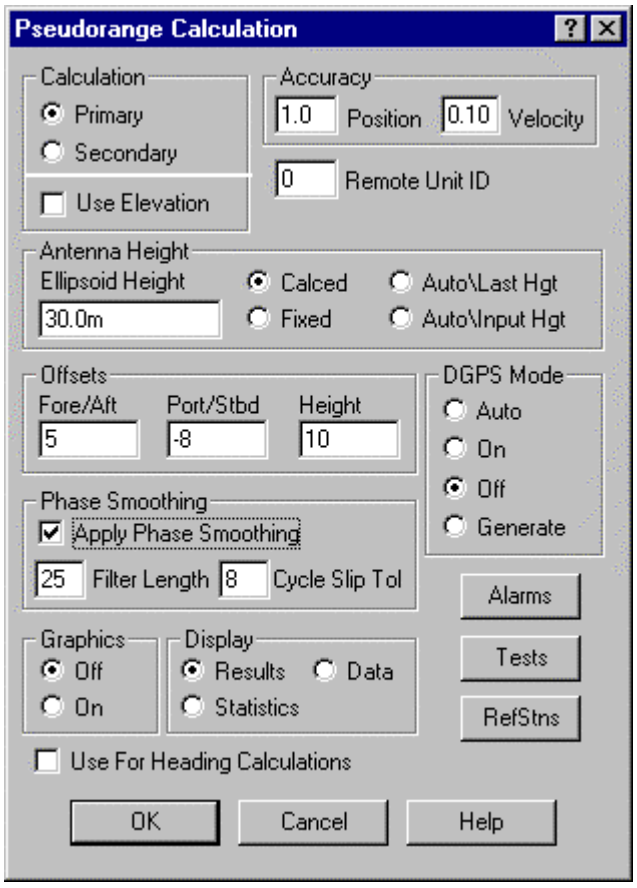
Graphics:
If Graphics is set to On, a labeled square will be made visible in the Graphics and Bird's Eye displays, depicting the raw (unfiltered) location of the GPS antenna. This provides a means of comparing raw and filtered positions between different sources.

Elevation:
If Elevation is set to On, depth values recorded during eventing will be related to the calculated Ellipsoid height value of the GPS antenna. Do not enable this option unless you are utilizing high accuracy (centimeter level) RTK type GPS positioning.

Code:
Set the Code to coincide with the code parameters that may be associated with the GPS unit being used, as required when using telemetered GPS data. This is usually set to 0.

Offsets:
Offsets are entered to relate the GPS antenna position to the vessel's Common Reference Point (CRP). Offsets are entered as measured from the CRP (of the vehicle) to the device (antenna) location. Offsets Fore and Starboard are entered as positive values, Offsets measured Port and Aft are entered as negative values.
Rule of thumb suggests the CRP "Z" reference should be at the water line.

Configure Pseudorange Calculation:
If you are using WinFrog to calculate a Multi-Reference position from the raw NR103 receiver, you must add both the Pseudorange and Ephemeris data items to the vehicle's device list. The Pseudorange device must edited to suit the application on this vehicle. (Note that no configuration is required for the Ephemeris device).
To configure the Pseudorange device, highlight the GPS,NR103 Pseudo, PSEUDORANGE device, then select the Edit button. The Pseudorange Calculation dialog window appears, as seen below.



See the NovAtel CON GPS device documentation for details on configuring the Pseudorange Calculation dialog window.

CONFIGURATION DETAILS:
The NR203's RS-232 connector is a standard DB type connector.

Serial Port Connections

DB-25	DE-9	Signal	Direction	DB-25
2	3	Tx Data	→	2
3	2	Rx Data	←	3
4	7	Request to send	→	4
5	8	Clear to send	←	5
6	6	Data Set Ready	←	6
7	5	signal ground		7
8	1	Data Carrier Detect	←	8
20	4	Data Terminal Ready	→	20
22	9	Ring Indicator	←	22

For NMEA interfacing, only concerned with Rx Data, signal ground (and possibly Tx Data, if we want the computer to talk to the GPS)

RAW DATA LOGGING:

The Fix Quality number (status) for the NR103 are as follows:

20= No Fix
21= SP GPS, with SA
22=SP GPS, No SA
23=SP GPS, No SA, Good HDOP/LPME
24=DGPS, 2D
25= DGPS, 2D, Good HDOP/LPME
26=DGPS, 3D, Poor RTCM/HDOP
27=DGPS, 3D, Poor HDOP, Good RTCM
28=DGPS, 3D, Good HDOP
29=DGPS, 3D, Good HDOP/RTCM

SPECIFICATIONS: NR203 (Manufacturer's)

Interfaces:

- Wide angle Electro-luminescent display
- 1 RS232 I/O port (up to 19200baud)
- 2 RS422 I/O ports (up to 76800 baud)
- Configurable display and serial ports

Processing features:

- Multi-path mitigation techniques
- Weighted least squares position processing
- UKOOA compliant navigation and QC processing

Conventional DGPS mode:

- A "primary" single station solution 0.6s rate (DGPS1)
- Up to 3 other parallel single solutions (DGPS2, 3, 4)
- An optimized "Multi-station" solution 0.6s rate (MDGPS) providing sub-metre to metre accuracy.

Other data:

- PPS output (<1us)
- External event time tagging (<1us)
- Raw data 10Hz rate

Corrections Format:

- NDS200 HF Format
- NDS100 UHF Format
- RTCM104 V2.1 Format

Differential input channels
Six parallel channels:

- 4 HF or Radio-beacon MF
- 1 UHF (or RTCM104)
- 1 RTCM 104 only

Differential antenna:

- HF and Radio-beacon
- Integrated reception
- Active type
- Frequency band 100kHz to 10MHz
- 30m RG58 cable