WinFrog Device Group:	**ROV**
Device Name/Model:	**General Dynamics**
Device Manufacturer:	
Device Data String(s) Output to WinFrog:	See Appendix (end of this document)
WinFrog Data String(s) Output to Device:	
WinFrog Data Item(s) and their RAW record:	ROV Data 496 Heading 409 Bottom Depth 911 Position 303

DEVICE DESCRIPTION:

Driver to interface with an ROV used by General Dynamics and/or their customers.

DEVICE CONFIGURATION INSTRUCTIONS

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.

The ROV status, sensor depth, altitude, heading, and SSBL determined Latitude, Longitude and depth are available in the Decoded Data of the I/O Device Window. There is also a display of the total number of positions sent to the ROV and the values of the last two position sent.

NOTE: It is important that the follow rule is followed when naming the vessels. The ROV vessel must be given a name that begins with the letter “R”. The ship must be given a name that does **not** begin with “R”.

WINFROG の入力と出力デバイス　＞　デバイスの配置：
その配置は入力と出力デバイスの窓にすることはいらないです。

すべてのデータは入力と出力デバイスの窓のデータ解読部に表示して利用できます。そのデータは遠隔操作船の状態、深さ、高さ、方向、SSBL が決めた経度、緯度と深さを含めています。

遠隔操作船に送った位置データの総数と一番最後送った位置データの値もその窓に表示しています。

注意：船に名を付ける時はつぎの規則を見守ることは大切なことです。遠隔操作船の名前の一番目の文字は必ず“R”を付けること、普通船の名前の一番目の文字は必ず“R”を付けないことにしています。

WINFROG VEHICLE TEXT WINDOW > CONFIGURE VEHICLE DEVICES > DEVICE > EDIT OPTIONS:
The **ROVDATA**, **HEADING, POSITION** and **BOTTOMDEPTH** data items can be added to the General Dynamics ROV vehicle. This will permit logging of the raw data files. All of the data items can be edited from the Configure Vehicle-Devices dialog box.

The **POSITION** data item should also be added to the ship. This will allow the ship's position to be sent to the ROV.

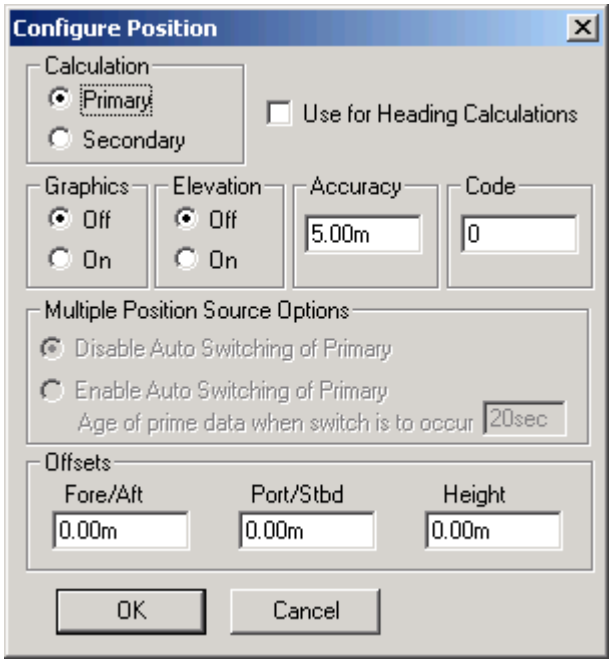
WINFROG　船の文字窓　＞　船のデバイスの配置　＞　デバイス　＞　編集の選択：
ROVDATA、HEADING、POSITION と **BOTTOMDEPTH** データ項目は遠隔操作船に追加することができます。　そうとしたら、そのデータはデータファイルに出力することが可能になります。すべてのデータ項目は船の配置―デバイスの対話窓に編集できます。

POSITION データ項目は船に追加することも必要です。そうしたら、船の位置が遠隔操作船に送ることは許されます。

Data item: ROV, General Dynamics, POSITION

The POSITION data item must be edited once it is added to a vehicle's device list. Highlight the data item in the vehicle's device list and click the Edit button. The Configure Position dialog box appears as seen below.

The POSITION data item must be edited once it is added to a vehicle's device list. Highlight the data item in the vehicle's device list and click the Edit button. The Configure Position dialog box appears as seen below.



Calculation:
Set the Calculation selection to Primary or Secondary. Devices set to Primary calculation are used to provide a vessel position. Note that more than one Primary positioning device can be added to a vehicle's device list; data from these devices will be combined in a weighted mean solution. (See the paragraph on Accuracy below for more on the weighting of Primary calculation device data).

If the Calculation type is set to Secondary, WinFrog will simply monitor the device's data. WinFrog will not use the data from a secondary device in the final solution of the vehicle's position.

If auto switching is enabled (see below) a secondary may automatically become a primary should all the primaries fail.

Use For Heading Calculations:
Select this checkbox if the device is to be used in conjunction with another GPS device for determination of the heading of the vessel.

Graphics:
If On is selected, a labeled square will show the raw (offset but unfiltered) location of the GPS antenna in the Graphics and Bird's Eye windows. This provides a means of comparing raw device and filtered vehicle positions.

Elevation:
Setting the Elevation option to On will result in the elevation determined by GPS to be used as the elevation of the vessel referencing the GPS (WGS84) Ellipsoid. The sounder data recorded in WinFrog's .RAW data files will not be affected.
This option is meant only for those applications where there is no fixed vertical reference (i.e. mean sea level), such as on a river. For acceptable results, this option requires the use of high accuracy "RTK" GPS data.

Accuracy:
The Accuracy value entered provides WinFrog with the expected accuracy of the position from this device. This value is used in the weighting of this device compared to other positioning devices that may be added to the vehicle's device list. The smaller the value entered, the more accurate it is considered to be, and hence the more weight that will be applied to the device's data.

The Accuracy parameter can be changed from the suggested values. Changes should be made with caution, however, as they will affect the final filtered position of the vehicle.

Code:
This entry window is used when the GPS data is being received by a remote GPS receiver connected via telemetry link. If this is the case, set the Code to coincide with the code parameters associated with the GPS unit being used.
For all other applications, the Code entry must be set to 0.

Multiple Position Source Options:
This group box allows you to enable automatic switching of a secondary to primary should the data from all POSITION and PSEUDORANGE data items set to primary timeout. The **Age** entered is the length of time that the secondary will wait in the absence of data from all primaries, before taking over as primary. This age is only entered for the secondary.

For example, if the POSITION or PSEUDORANGE data items associated with two GPS receivers were set to primary and the POSITION or PSEUDORANGE data item of a third GPS receiver was set to secondary, both primary GPS receivers must time out before the secondary will become the primary. Upon the recovery of either of the original primary data items, the original primary will be reset to primary and the original secondary will be reset to secondary.

Note for the auto switching feature to work, there must be at least one primary and one secondary enabled. For example, given two data items, one set to primary with the auto switching disabled and the other set to secondary with the auto switching enabled, if the primary fails the secondary is not set to primary and the vehicle positioning stops until the primary data item recovers.

Disable Auto Switching of Primary:
If this data item is not to be involved in the auto switching process, check this box. As stated above, this data item is then not involved in the auto switching process in any way.

Enable Auto Switching of Primary:
If this data item is to be involved in the auto switching process, either as a primary or a secondary, check this box. If set to secondary, enter the Age of data the primary data items must reach before this secondary is switched to act as the primary.

In order for this option to be effective you must have at least one primary and one secondary. If there are multiple secondary data items that are enabled for switching, the first one to receive data will become primary.

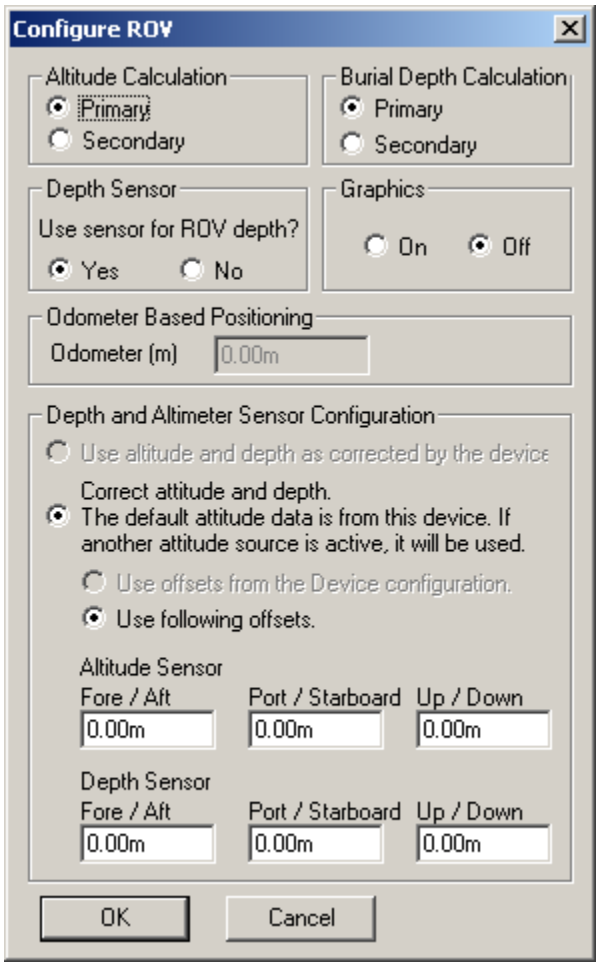
Note: This option is not enabled unless WinFrog determines that there is more than one POSITION and/or PSEUDORANGE data item associated with the respective vehicle. The exception to this is the case of a WinFrog with the Remote module operating as a Controlled Remote being configured remotely from the Controller. In this case, the option is always enabled even though it may not be applicable. The operator must be aware of what is available on the Remote and configure the data item accordingly.

Note: This option is not available in the WinFrog Remote package.

Note: This option is not available for USBL based POSITION data items.

Offsets:
Offsets are required to associate the GPS antenna position with the vessel's Common Reference Point (CRP). The offsets are applied *from* CRP (of the vehicle) *to* the GPS antenna location.
Forward Offsets are entered as positive values.
Aft Offsets are entered as negative values.
Starboard Offsets are entered as positive values.
Port Offsets are entered as negative values.
Height Offsets are positive upwards. (It is suggested that the vessel's Height origin should be at the water line.

Data item: ROV, General Dynamics, ROVDATA



Altitude Calculation/Burial Depth Calculation:
The altitude and burial depth calculations should be set to Primary if either is being used for real-time positioning of the ROV or towed vehicle.

Graphics:
Turning on the Graphics will display the device name and a square at the location of the hydrophone, within the Graphics and Bird's Eye windows.

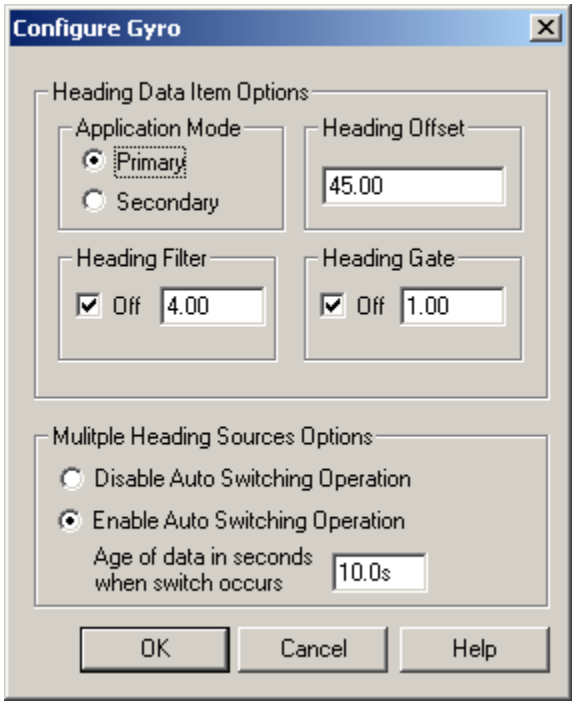
Depth and Altimeter Sensor Configuration:
Vertical offsets of the altitude and depth sensors, relative to the CRP, can be input here. The Altitude Offset is the vertical distance (positive up) from the ROV's CRP to the acoustic beacon tracking the seafloor. The Depth Offset would be the vertical distance from the ROV's CRP to the sensor that provides depth information of the ROV. The water column depth would be the sum of the depth reading, the two offsets, and the altitude value.

Depth Sensor:
The real-time depth of the ROV can be determined from the ROV depth value or a separate depth (pressure) sensor, if one is installed on the ROV.

Odometer Based Positioning:
The odometer based positioning option is not used for this device.

Data item: ROV, General Dynamics, HEADING

The configuration of the Heading is accomplished using the Configure Gyro dialog box. The device driver supplies a heading value for the ROV. You may wish to set this device to secondary, where the heading will be available for post processing, but not for real-time display.



Heading Data Item Options:

Application Mode(Primary/Secondary):
Set the type of calculation to Primary or Secondary by selecting the appropriate radio button. Devices set to Primary are used to provide the vehicle heading information. Devices set to Secondary are simply monitored, and are not used in the vehicle's calculations.

Note that WinFrog supports automatic switching from a designated Primary to a Secondary in the event that data from the Primary fails (see Multiple Heading Sources Options).

Heading Offset:
A correction value (as determined from a gyro calibration) can be input in the Heading Offset box. This value is added to the heading value from the device to provide a corrected heading for the vehicle. Note that positive or negative values can be entered.

Heading Filter/Heading Gate:
The Heading Filter is used to “smooth” heading values used by the vehicle. The value entered in the Heading Filter indicates the number of headings that will be used to predict the next heading value. The larger the value entered, the “heavier” the filter will be – i.e. the slower the vehicle’s heading will respond to changes.

The Heading Gate defines a tolerance value to limit the use of anomalies in gyro readings. If the next observed gyro value received falls outside the specified range of predicted values (i.e. plus or minus the entered value), the value will not be used.

Multiple Heading Sources Options:
WinFrog supports automatic switching from a designated Primary source to an alternate Secondary source in the event that the Primary fails. The first Secondary source to receive data after the Primary has failed becomes the alternate Primary providing the heading for the vehicle. When the designated Primary is detected as active again, the alternate Primary source reverts to Secondary and the designated Primary provides the heading data to the vehicle.

If an alternate Secondary fails and there are additional Secondary sources, it in turn is detected by the first of the remaining operational Secondary sources to receive data after the failure, at which time this Secondary becomes the alternate Primary.

Note that this option is only available if more than one HEADING source is associated with the respective vehicle. Changes made to the Auto Switching options for any one of the HEADING data items are automatically assigned to the others upon exiting this dialog with OK. If the Auto Switching option is enabled and the respective HEADING source has been set to Primary, all others are automatically set to Secondary. The exception to this is when configuring a WinFrog Controlled Remote (WinFrog with a Remote module) from a Controller. In this case, changes made to one HEADING source are not automatically made to other HEADING sources. The operator must explicitly make them for each HEADING source.

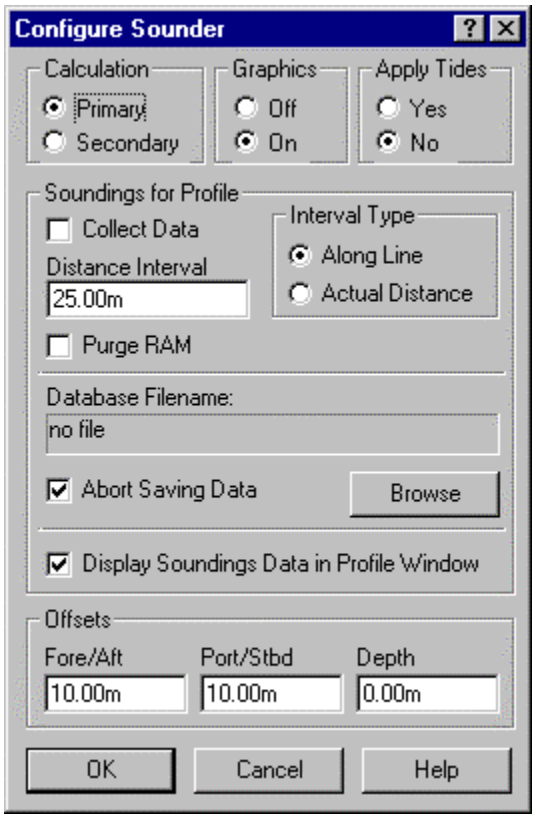
This option is not available in the WinFrog Remote package.

Disable/Enable Auto Switching Operation:
Select the mode you wish to operate WinFrog.

Age of data in seconds when switch occurs:
Enter the age of data that is permitted before the source is considered to have failed.

Data item: ROV, General Dynamics, BOTTOMDEPTH

Editing the BOTTOMDEPTH data item in the Configure Vehicle – Devices dialog box brings up the Configure Sounder dialog box.



Calculation:
Set the type of calculation to primary or secondary using the calculation radio buttons. A primary sounder will record data in the vehicles' raw data files (i.e. raw data type 300, 350, 351), where the secondary sounder setup will not. In either case the raw data will still be recorded under the 411 data type.

Graphics:
If the Graphics is turned on, a labeled square will show the raw (unfiltered) location of the sounder, in the Graphics and/or Bird's Eye windows.

Apply Tides:
If the On radio button is selected, WinFrog will apply tidal corrections to the observed depth data to enable the display and recording of chart datum referenced depths. Tide data can be received from an interfaced real time depth sensor or from tide prediction files containing time and tide height data. Note that the tide device or file must also be added to the vehicle's device list. Refer to documentation on the Tide device for more information.

Note: The Ribbit processing program uses the same tide format as WinFrog.

Soundings for Profile:
This section permits the collection of data for database logging separate from WinFrog and Ribbit. This database can then be used for numerous applications including real time display within the Profile Window, or data collection for later display in the Profile Window.

Data will be collected, at the Distance Interval stated, when the 'Collect Data' checkbox is selected. The interval can be either Along Line, or at the Actual Distance (from last fix).

The data is stored in the RAM memory of the computer. Any data collected that will not be required at later time, can be deleted by selecting the **Purge RAM** checkbox and exiting the dialog by clicking the OK button.

A **Database Filename** can be chosen and the filename is displayed in this window. The **Abort Saving Data** checkbox can be selected if a problem occurs, and you want to stop saving the data at that instance.

The **Display Soundings Data in Profile Window** checkbox can be selected if you want the data to be displayed in the Profile Window, in real time.

Offsets:
The offsets for the individual transducer are input here. The standard Fore/Aft, Port/Starboard offset signage is used. The depth value is positive down. Rule of thumb suggests that the water line be used for the vertical datum.

Note: Presently the sounder offsets should be left out unless the Altitude and Depth sensors are in the same X, Y location. Post-processing the data, with an attitude (pitch and roll) sensor present on the ROV will provide more accurate water depths should the ROV be tilted.

CONFIGURATION DETAILS:
Refer to system documentation on the installation and hook up of this unit. Interfacing to this unit should only be performed by experienced personnel.

CHECK: Confirm that the SSBL button on the ROV console is in the **ON** position prior to operating the system. Valid ROV positions will not be returned to Winfrog unless this button is **ON**.

大切なチェック： ROV 操作部うえの SSBL というボタンは必ず **ON** の状態に WINFROG システムを操作します。もしそのボタンは **OFF** にしたら、有効な遠隔操作船の位置データは WINFROG システムに届けないことになります。

APPENDIX – Data String Format

DATA FORMAT TABLE-1 (1/6)

ROV CONSOLE to S9 (FMS)

Byte	Function		Type	Description
0	STX(header)		02H	Start of Text
1	ROV POWER ON/OFF		ASCII	「0」 : OFF / 「1」 : ON
2	Comma		ASCII	「, 」
3	Time of SSBL fixed	24 hour	ASCII	$\times 10^{1}$ When SSBL is invalid,
4				$\times 10^{0}$ Data should be 「0」
5		Minute		$\times 10^{1}$ When SSBL is invalid,
6				$\times 10^{0}$ Data should be 「0」
7		Second		$\times 10^{1}$ When SSBL is invalid,
8				$\times 10^{0}$ Data should be 「0」
9	Comma		ASCII	「, 」
10	SSBL slant range[m]		ASCII	$\times 10^{4}$ When SSBL is invalid,
11				$\times 10^{3}$ Data should be 「0」
12				$\times 10^{2}$
13				$\times 10^{1}$
14				$\times 10^{0}$
15				「. 」 : Period
16				$\times 10^{-1}$
17	Comma		ASCII	「, 」
18	Latitude of SSBL ROV Position	N/S	ASCII	「N」 : North / 「S」 : South / 「0」 : Invalid data
19		Deg.		$\times 10^{1}$
20				$\times 10^{0}$
21		Min.		$\times 10^{1}$
22				$\times 10^{0}$
23				「. 」 : Period
24				$\times 10^{-1}$
25				$\times 10^{-2}$
26				$\times 10^{-3}$
27	Comma		ASCII	「, 」
28	Longtitude of SSBL ROV Position	E/W	ASCII	「E」 : East / 「W」 : West / 「0」 : Invalid data
29		Deg.		$\times 10^{2}$
30				$\times 10^{1}$
31				$\times 10^{0}$
32		Min.		$\times 10^{1}$
33				$\times 10^{0}$
34				「. 」 : Period
35				$\times 10^{-1}$
36				$\times 10^{-2}$
37				$\times 10^{-3}$
38	Comma		ASCII	「, 」
39	SSBL ROV Depth [m]		ASCII	$\times 10^{4}$
40				$\times 10^{3}$
41				$\times 10^{2}$
42				$\times 10^{1}$
43				$\times 10^{0}$
44				「. 」 : Period
45				$\times 10^{-1}$
46	Comma		ASCII	「, 」

DATA FORMAT

TABLE-1 (2/6)

ROV CONSOLE to S9 (FMS)

Byte	Function		Type	Description
47	ROV Sensor detected depth [m]		ASCII	$\times 10^{3}$ When Byte#1 is ON, this data is valid data.
48				$\times 10^{2}$ When Byte#1 is OFF, this data is invalid data.
49				$\times 10^{1}$
50				$\times 10^{0}$
51				「. 」 : Period
52				$\times 10^{-1}$
53	Comma		ASCII	「, 」
54	ROV Heading [°]		ASCII	$\times 10^{2}$ When Byte#1 is ON, this data is valid data.
55				$\times 10^{1}$ When Byte#1 is OFF, this data is invalid data.
56				$\times 10^{0}$
57				「. 」 : Period
58				$\times 10^{-1}$
59	Comma		ASCII	[,]
60	ROV Altitude [m]		ASCII	$\times 10^{1}$ When Byte#1 is ON, this data is valid data.
61				$\times 10^{0}$ When Byte#1 is OFF, this data is invalid data.
62				「. 」 : Period
63				$\times 10^{-1}$
64	Comma		ASCII	「, 」
65	Latitude of ROV Waypoint 1	N/S	ASCII	「N」 : North / 「S」 : South / 「0」 : Invalid data
66		Deg.		$\times 10^{1}$
67				$\times 10^{0}$
68		Min.		$\times 10^{1}$
69				$\times 10^{0}$
70		Sec.		$\times 10^{1}$
71				$\times 10^{0}$
72				「. 」 : Period
73				$\times 10^{-1}$
74	Comma		ASCII	「, 」
75	Longtitude of ROV Waypoint 1	E/W	ASCII	「E」 : East / 「W」 : West / 「0」 : Invalid data
76		Deg.		$\times 10^{2}$
77				$\times 10^{1}$
78				$\times 10^{0}$
79		Min.		$\times 10^{1}$
80				$\times 10^{0}$
81		Sec.		$\times 10^{1}$
82				$\times 10^{0}$
83				「. 」 : Period
84				$\times 10^{-1}$
85	Comma		ASCII	「, 」
86	Latitude of ROV Waypoint 2	N/S	ASCII	「N」 : North / 「S」 : South / 「0」 : Invalid data
87		Deg.		$\times 10^{1}$
88				$\times 10^{0}$
89		Min.		$\times 10^{1}$
90				$\times 10^{0}$
91		Sec.		$\times 10^{1}$
92				$\times 10^{0}$
93				「. 」 : Period
94				$\times 10^{-1}$
95	Comma		ASCII	「, 」

DATA FORMAT

TABLE-1 (3/6)

ROV CONSOLE to S9 (FMS)

Byte	Function		Type	Description
96	Longtitude of ROV Waypoint 2	E/W	ASCII	「E」 : East / 「W」 : West / 「0」 : Invalid data
97		Deg.		$\times 10^{2}$
98				$\times 10^{1}$
99				$\times 10^{0}$
100		Min.		$\times 10^{1}$
101				$\times 10^{0}$
102		Sec.		$\times 10^{1}$
103				$\times 10^{0}$
104				「. 」 : Period
105				$\times 10^{-1}$
106	Comma		ASCII	「, 」
107	Latitude of ROV Waypoint 3	N/S	ASCII	「N」 : North / 「S」 : South / 「0」 : Invalid data
108		Deg.		$\times 10^{1}$
109				$\times 10^{0}$
110		Min.		$\times 10^{1}$
111				$\times 10^{0}$
112		Sec.		$\times 10^{1}$
113				$\times 10^{0}$
114				「. 」 : Period
115				$\times 10^{-1}$
116	Comma		ASCII	「, 」
117	Longtitude of ROV Waypoint 3	E/W	ASCII	「E」 : East / 「W」 : West / 「0」 : Invalid data
118		Deg.		$\times 10^{2}$
119				$\times 10^{1}$
120				$\times 10^{0}$
121		Min.		$\times 10^{1}$
122				$\times 10^{0}$
123		Sec.		$\times 10^{1}$
124				$\times 10^{0}$
125				「. 」 : Period
126				$\times 10^{-1}$
127	Comma		ASCII	「, 」
128	Latitude of ROV Waypoint 4	N/S	ASCII	「N」 : North / 「S」 : South / 「0」 : Invalid data
129		Deg.		$\times 10^{1}$
130				$\times 10^{0}$
131		Min.		$\times 10^{1}$
132				$\times 10^{0}$
133		Sec.		$\times 10^{1}$
134				$\times 10^{0}$
135				「. 」 : Period
136				$\times 10^{-1}$
137	Comma		ASCII	「, 」
138	Longtitude of ROV Waypoint 4	E/W	ASCII	「E」 : East / 「W」 : West / 「0」 : Invalid data
139		Deg.		$\times 10^{2}$
140				$\times 10^{1}$
141				$\times 10^{0}$
142		Min.		$\times 10^{1}$
143				$\times 10^{0}$
144		Sec.		$\times 10^{1}$
145				$\times 10^{0}$
146				「. 」 : Period
147				$\times 10^{-1}$

DATA FORMAT

TABLE-1 (4/6)

ROV CONSOLE to S9 (FMS)

Byte	Function		Type	Description
148	Comma		ASCII	「, 」
149	Latitude of ROV Waypoint 5	N/S	ASCII	「N」 : North / 「S」 : South / 「0」 : Invalid data
150		Deg.		$\times 10^{1}$
151				$\times 10^{0}$
152		Min.		$\times 10^{1}$
153				$\times 10^{0}$
154		Sec.		$\times 10^{1}$
155				$\times 10^{0}$
156				「. 」 : Period
157				$\times 10^{-1}$
158	Comma		ASCII	「, 」
159	Longtitude of ROV Waypoint 5	E/W	ASCII	「E」 : East / 「W」 : West / 「0」 : Invalid data
160		Deg.		$\times 10^{2}$
161				$\times 10^{1}$
162				$\times 10^{0}$
163		Min.		$\times 10^{1}$
164				$\times 10^{0}$
165		Sec.		$\times 10^{1}$
166				$\times 10^{0}$
167				「. 」 : Period
168				$\times 10^{-1}$
169	Comma		ASCII	「, 」
170	Latitude of ROV Waypoint 6	N/S	ASCII	「N」 : North / 「S」 : South / 「0」 : Invalid data
171		Deg.		$\times 10^{1}$
172				$\times 10^{0}$
173		Min.		$\times 10^{1}$
174				$\times 10^{0}$
175		Sec.		$\times 10^{1}$
176				$\times 10^{0}$
177				「. 」 : Period
178				$\times 10^{-1}$
179	Comma		ASCII	「, 」
180	Longtitude of ROV Waypoint 6	E/W	ASCII	「E」 : East / 「W」 : West / 「0」 : Invalid data
181		Deg.		$\times 10^{2}$
182				$\times 10^{1}$
183				$\times 10^{0}$
184		Min.		$\times 10^{1}$
185				$\times 10^{0}$
186		Sec.		$\times 10^{1}$
187				$\times 10^{0}$
188				「. 」 : Period
189				$\times 10^{-1}$
190	Comma		ASCII	「, 」
191	Latitude of ROV Waypoint 7	N/S	ASCII	「N」 : North / 「S」 : South / 「0」 : Invalid data
192		Deg.		$\times 10^{1}$
193				$\times 10^{0}$
194		Min.		$\times 10^{1}$
195				$\times 10^{0}$
196		Sec.		$\times 10^{1}$
197				$\times 10^{0}$
198				「. 」 : Period
199				$\times 10^{-1}$

DATA FORMAT

TABLE-1 (5/6)

ROV CONSOLE to S9 (FMS)

Byte	Function		Type	Description
200	Comma		ASCII	「, 」
201	Longtitude of ROV Waypoint 7	E/W	ASCII	「E」 : East / 「W」 : West / 「0」 : Invalid data
202		Deg.		$\times 10^{2}$
203				$\times 10^{1}$
204				$\times 10^{0}$
205		Min.		$\times 10^{1}$
206				$\times 10^{0}$
207		Sec.		$\times 10^{1}$
208				$\times 10^{0}$
209				「. 」 : Period
210				$\times 10^{-1}$
211	Comma		ASCII	「, 」
212	Latitude of ROV Waypoint 8	N/S	ASCII	「N」 : North / 「S」 : South / 「0」 : Invalid data
213		Deg.		$\times 10^{1}$
214				$\times 10^{0}$
215		Min.		$\times 10^{1}$
216				$\times 10^{0}$
217		Sec.		$\times 10^{1}$
218				$\times 10^{0}$
219				「. 」 : Period
220				$\times 10^{-1}$
221	Comma		ASCII	「, 」
222	Longtitude of ROV Waypoint 8	E/W	ASCII	「E」 : East / 「W」 : West / 「0」 : Invalid data
223		Deg.		$\times 10^{2}$
224				$\times 10^{1}$
225				$\times 10^{0}$
226		Min.		$\times 10^{1}$
227				$\times 10^{0}$
228		Sec.		$\times 10^{1}$
229				$\times 10^{0}$
230				「. 」 : Period
231				$\times 10^{-1}$
232	Comma		ASCII	「, 」
233	Latitude of ROV Waypoint 9	N/S	ASCII	「N」 : North / 「S」 : South / 「0」 : Invalid data
234		Deg.		$\times 10^{1}$
235				$\times 10^{0}$
236		Min.		$\times 10^{1}$
237				$\times 10^{0}$
238		Sec.		$\times 10^{1}$
239				$\times 10^{0}$
240				「. 」 : Period
241				$\times 10^{-1}$
242	Comma		ASCII	「, 」
243	Longtitude of ROV Waypoint 9	E/W	ASCII	「E」 : East / 「W」 : West / 「0」 : Invalid data
244		Deg.		$\times 10^{2}$
245				$\times 10^{1}$
246				$\times 10^{0}$
247		Min.		$\times 10^{1}$
248				$\times 10^{0}$
249		Sec.		$\times 10^{1}$
250				$\times 10^{0}$
251				「. 」 : Period
252				$\times 10^{-1}$

DATA FORMAT

TABLE-1 (6/6)

ROV CONSOLE to S9 (FMS)

Byte	Function		Type	Description
253	Comma		ASCII	「, 」
254	Latitude of ROV Waypoint 10	N/S	ASCII	「N」 : North / 「S」 : South / 「0」 : Invalid data
255		Deg.		$\times 10^{1}$
256				$\times 10^{0}$
257		Min.		$\times 10^{1}$
258				$\times 10^{0}$
259		Sec.		$\times 10^{1}$
260				$\times 10^{0}$
261				「. 」 : Period
262				$\times 10^{-1}$
263	Comma		ASCII	「, 」
264	Longtitude of ROV Waypoint 10	E/W	ASCII	「E」 : East / 「W」 : West / 「0」 : Invalid data
265		Deg.		$\times 10^{2}$
266				$\times 10^{1}$
267				$\times 10^{0}$
268		Min.		$\times 10^{1}$
269				$\times 10^{0}$
270		Sec.		$\times 10^{1}$
271				$\times 10^{0}$
272				「. 」 : Period
273				$\times 10^{-1}$
274	Comma		ASCII	「, 」
275	ETX		03H	End of Text
276	BCC(H)			
277	BCC(L)			
278	CR			
279	LF			

Principle of BCC generation

STX	TEXT(DATA)	EXT	BCC(H)	BCC(H)	CR	LF

(*) EXCLUSIVE-OR operation should be done among all bytes of this part (*).

Both 4 bits in the higher-order and lower-order of EXCLUSIVE-OR operation result should be converted into ASCII codes.
The code from the higher 4 bits shall be set as BCC(H) and the other one as BCC(L).
The transmission cycle shall be 30 seconds.