

Product Marketing Update

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3011

Parameter setting

Product concerned

Product Names:

3011 "Sensor", 3011 "Receiver", 3011 "DGPS Sensor", 3011 "DGPS Receiver"

Product Family:

Marine Survey

1. PURPOSE

The quality of operation of a system integrating a 3011 (or an Aquarius²) can be greatly enhanced by properly setting the parameters. This technical note intends to describe the various filters applied on some variables, their parameter settings and recommend typical settings for some application.

The 3 most important measurement affected by parameter settings are :

- Heading,
- Speed.

2. HEADING

2.1. Heading measurement variables

The 3011 computes internally 3 variables :

- **HeadingA** (Accurate), actual measure, output every 0.5 sec;
- HeadingR, filtered, output every 0.5 sec;
- **HeadingE**, extrapolated from HeadingR, also called real time, output rate as defined by OUTMES (maximum rate 20Hz).

In the rest of this document we will call these variables respectively HdgA, HdgR and HdgE.





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2.2. Output value selection "HDGSEL"

The variable used in the output messages can be selected using HDGSEL parameter.

- \$GPHDT, True heading, as per NMEA standard,
- \$GPHDG, Magnetic heading with magnetic deviation set to 0, as per NMEA standard,
- \$GPVHW, True heading and speed, as per NMEA standard,
- \$GPOSD, True heading, course and speed, as per NMEA standard,
- \$PDAS,HRP, True heading and magnetic deviation, proprietary message,

HDGSEL	1	3
\$GPHDT	HdgE	HdgA
\$GPHDG	HdgE	HdgA
\$GPHDM	HdgE	HdgA
\$GPVHW	HdgE	HdgA
\$GPOSD	HdgE	HdgA
HRP	HdgE	HdgA

By using proprietary commands it is possible to output directly the HdgA and HdgR values as :

- HRPA,
- HRPR.

Ex: \$PDAS,FMT,18,HRPR:3:2

- with : 18 : message line number, 3 : degrees, 3 digits
 - 2 : 2 decimals.

2.3. HDGSEL setting

HDGSEL can be set using a command only.

\$PDAS,HDGSEL,a[*hh] with "a" =
1 : "real time" (i.e. extrapolated) mode,
3 : "accurate" mode.
[*hh] is a checksum.
Default = "1".

Example : \$PDAS,HDGSEL (query) \$PDAS,HDGSEL,1*29 (response) (unit set in "real time mode") \$PDAS,HDGSEL,3 (setting in "accurate" mode)



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2.4. Filtered value (HdgR) adjustment "HDGSET"

"HdgR" is a filtered heading smoothing the heading evolution and therefore offering a less noisy output value but by introducing a delay. "HdgR" filter can be adjusted through "HDGSET" parameter. "HDGSET" is expressed in seconds between 0 and 60.

Impact : the higher the filter value, the smoother the output (more weight on previous measure). On the other side, the higher the filter value, the later the output takes into account an actual variation.

"HDGSET" can be set using :

- the man-machine interface (TRM100),
- a command .

2.4.1. HDGSET setting using TRM100

Mar 29 :	2002 l	_RK (J.18 1	FD10/01s			
UTC 09:	59:41 '	****		09/12SVs			
47°17.9	937673N	WGS84	4	00.0 KT			
001°30.9	543202W	88.41m		COG ***.*°			
/MAIN/AUX/INIT/HEADING							
Time elapsed							
	00:00:00						
	Length	Orient.	Site	Filter			
Average	0.00	0.00	0.00				
RMS	***.**	***.**	***.**				
Used	006.500m	000.00°	+15.23°	00s.			
Dead reck. time							
	INITIALIZATION		300s.				
<	BASE	OFFSET	APPLY	OK			

2.4.2. HDGSET setting command

\$PDAS,HDGSET,a,b,c,d,e[*hh] with :

- a : baseline length, in meters, [0; 999],
- b : horizontal offset, in degrees, [0; 360],
- c : site offset, in degrees, [-90; +90],
- d : heading filter time constant, in seconds, [0; 60],
- e : heading dead reckoning time, in seconds, [0; 600],
- f: not used,
- [*hh] is a checksum.
- Default = "2" for 3011, "0" for Aquarius².

Example : \$PDAS,HDGSET (query) \$PDAS,HDGSET,0.40,91.6,2.1,2.0,300,15*2A (response)

\$PDAS,HDGSET,,,,10

(setting at 10 seconds)



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3. SPEED

It is also possible to filter the "speed overground" variable. The operator can select among 3 preset values ("**FILTYP**"). The operator can adjust these preset values ("**FILTER**").

3.1. Speed Filter "FILTYP"

The filter applied to the "speed over ground" variable is selected through the "**FILTYP**" parameter. There are 3 speed filters :

- **low** time constant,
- **medium** time constant,
- high time constant.

The filter type selection (low, medium or high) is performed using the TRM100 or a command. The value of the time constant can be adjusted using "**FILTER**".

3.1.1. Speed filter setting using TRM100

Dec 19 2	2001 0	GPS	Q.	. 3	T)**/**s	
UTC 11:0	01:23	HDG			07	/09SVs	
47°17.9	3467N	WGS	384		()O.O KT	
001°30.5	519OW	- 25	5.8	m	ΩG	***.*°	
/MAIN/AUX/SPEED							
Speed Filtering Low							
<				IN	IT	OK	

3.1.2. Speed Filter setting command

\$PDAS,FILTYP,a[*hh] with "a" = 1 : medium

2 : low 3 : high [*hh] is a checksum. Default = "1".

Example : \$PDAS,FILTYP \$PDAS,FILTYP,1*29

(query) (response)

\$PDAS,FILTYP,2

(setting)



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3.2. Speed Filter constants "FILTER"

Each filter type (low, medium and high) can be adjusted through the "FILTER" parameter using the TRM100 or a command.

3.2.1. Speed filter constants setting using TRM100

Pressing on INIT (F4) of the previous screen gives access to the speed filter setting menu :



3.2.2. Speed Filter constant setting command

\$PDAS,FILTER,a,b,c[*hh]

- a : preset medium time constant, [0, 999], in second, default=20, b : preset low time constant, [0, 999], in second, default=6,
- c: preset high time constant, [0, 999], in second, default=60,

[*hh] is a checksum.

Example : \$PDAS,FILTER (query) \$PDAS,FILTER,20,6,60*34 (response)

\$PDAS,FILTER,10,5,50 (setting)

4. **RECOMMENDATION**

The current extrapolation algorithm is going to be improved in a future firmware release. For the time being, we recommend the following setting :

- HDGSEL : 3
- HDGSET : 2
- FILTYP : medium
- FILTER : standard (2, 20, 60)
- Update rate (OUTMES) : 2 Hz