

Measurements of lateral flow from the Mississippi River using a towed
trimaran near the Bohemia Spillway

A field report

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By

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Flow measurements of lateral flow from the Mississippi River using a towed trimaran near the Bohemia Spillway.

Introduction

The Coastal Hydrodynamics Laboratory, with assistance by a field support group at Pontchartrain Institute for Environmental Sciences conducted a survey of a new small pass in the Mississippi River at the Bohemia Spillway. The survey was conducted on February 1, 2013.

Objective

The objective of the survey was to measure the flow in the pass, namely Mardi Gras pass.

Methods

To measure flow, we used an Acoustic Doppler Current Profiler (ADCP), and used the instruments bottom track for positioning. The survey was conducted in an area where turbulence and air bubbles were at a minimum, to avoid acoustic errors and therefore errors in the flow measurement. We used a trimaran, towed along the width of the channel using a rope. The instrument is employed with a Bluetooth connection, and transmits data to the bank, where a computer receives the data instantaneously. Several passes were conducted to ensure consistency.

Results

The flow in the new pass, namely Mardi Gras pass, is of the order of 58.6 -59.9 m³/s, or 2070 - 2114 cfs, at the time of measurement. The standard deviation derived from the field measurements was 0.5 m³/s. Therefore, the average flow at the time of measurement was 59.4 ± 0.5 m³/s, or 2097 ± 16.6 cfs. Appendix A shows screenshots from different transects conducted by the trimaran. Preliminary stage discharge curves and time of surveys compared with the gauge height in the River are shown in Figures 3.

Acknowledgments

We thank Andrew Lane, John Burnette and Gregory Mattson II, for assistance in the field.



Figure 1. Trimaran transversing the cut



Figure 2. Trimaran transversing the cut

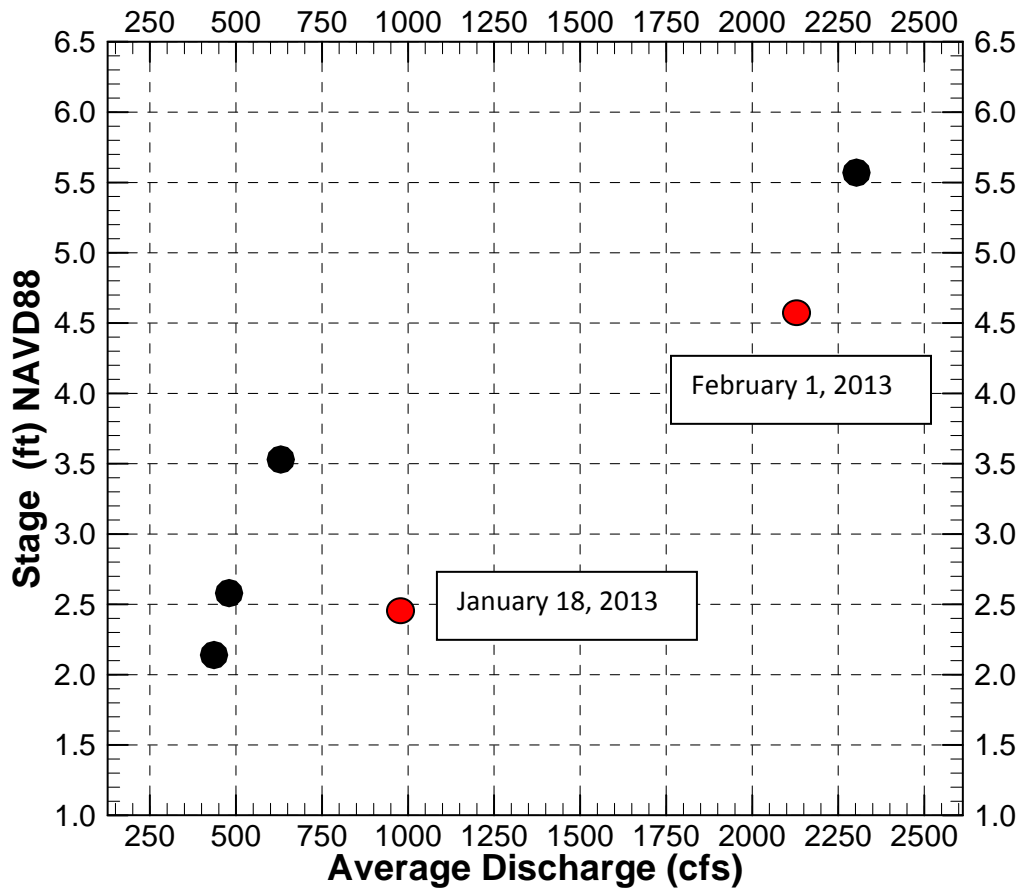


Figure 3. Preliminary stage discharge curve for MG Pass (at the time of measurement for field visit 6, the stage in the River at West Point a la Hache was ~4.6 ft).

Table 1 Discharge details from each survey (1-5) with statistics and Stage (ft) at West point a la Hache.

Survey number	Date	Average Discharge (cfs)	Standard Deviation (cfs)	Standard Error (cfs)	Average Discharge (cms)	Standard Deviation (cms)	Standard Error (cms)	Stage (ft)
MGP01	3/28/2012	2303.0	59.4	24.3	65.2	1.7	0.7	5.57
MGP02	4/18/2012	630.3	10.8	5.4	17.8	0.3	0.2	3.53
MGP03	5/3/2012	479.9	23.3	10.4	13.6	0.7	0.3	2.58
MGP04	7/3/2012	436.1	13.5	6.0	12.3	0.4	0.2	2.14
MGP05	1/16/2013	981.9	24.7	12.4	27.8	0.7	0.3	2.45
MGP06	2/1/2013	2097.2	16.6	6.8	59.4	0.5	0.2	4.60

Appendix A. Screenshots of WinRiver II - ADCP - interface with processed data

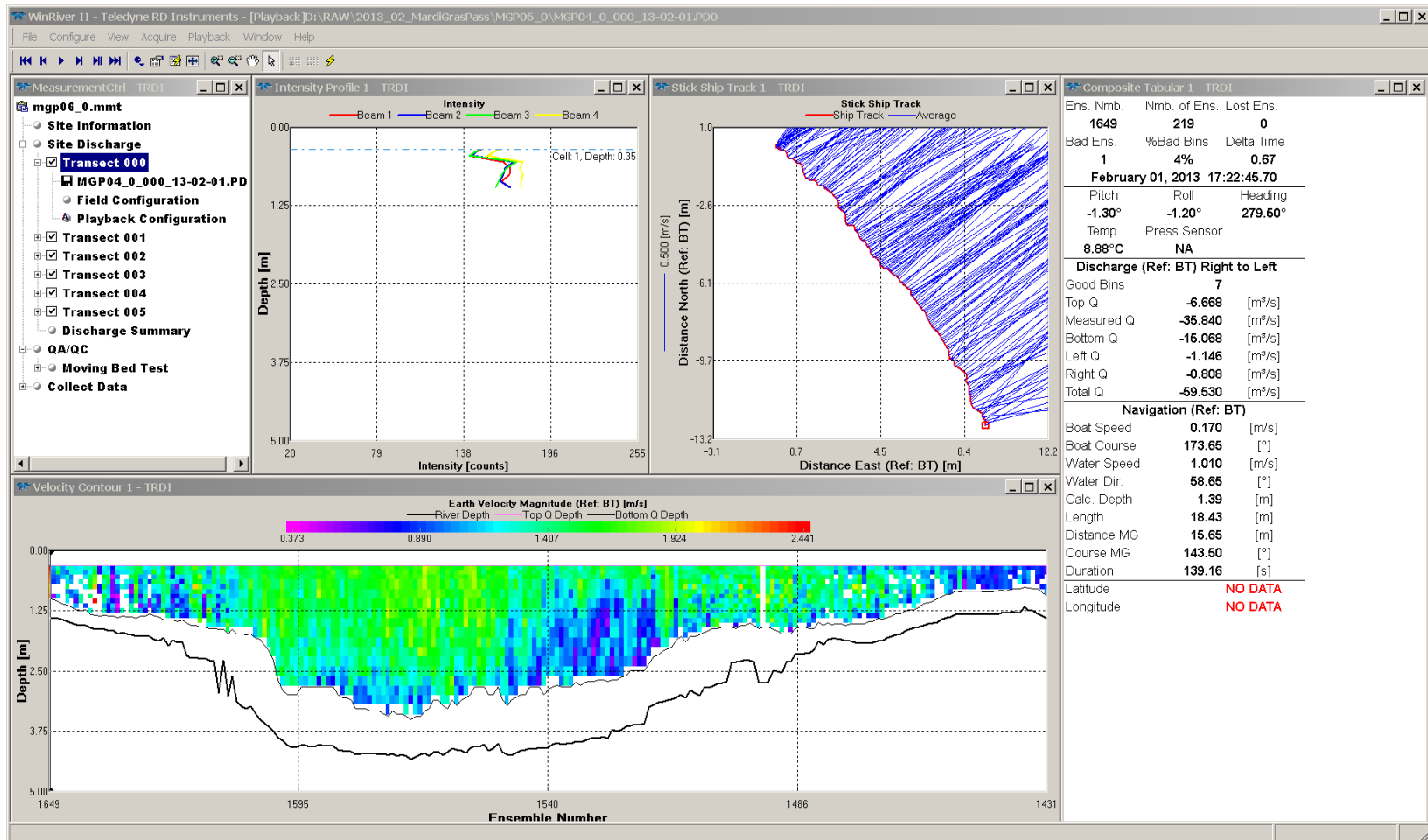
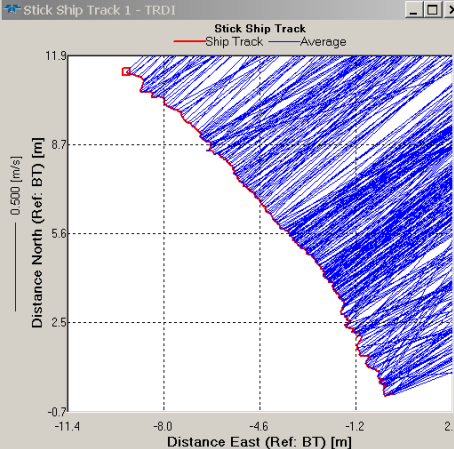
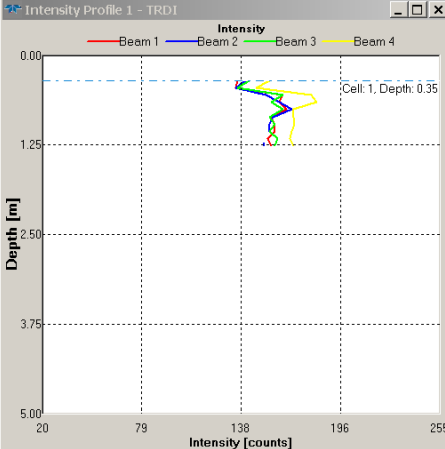
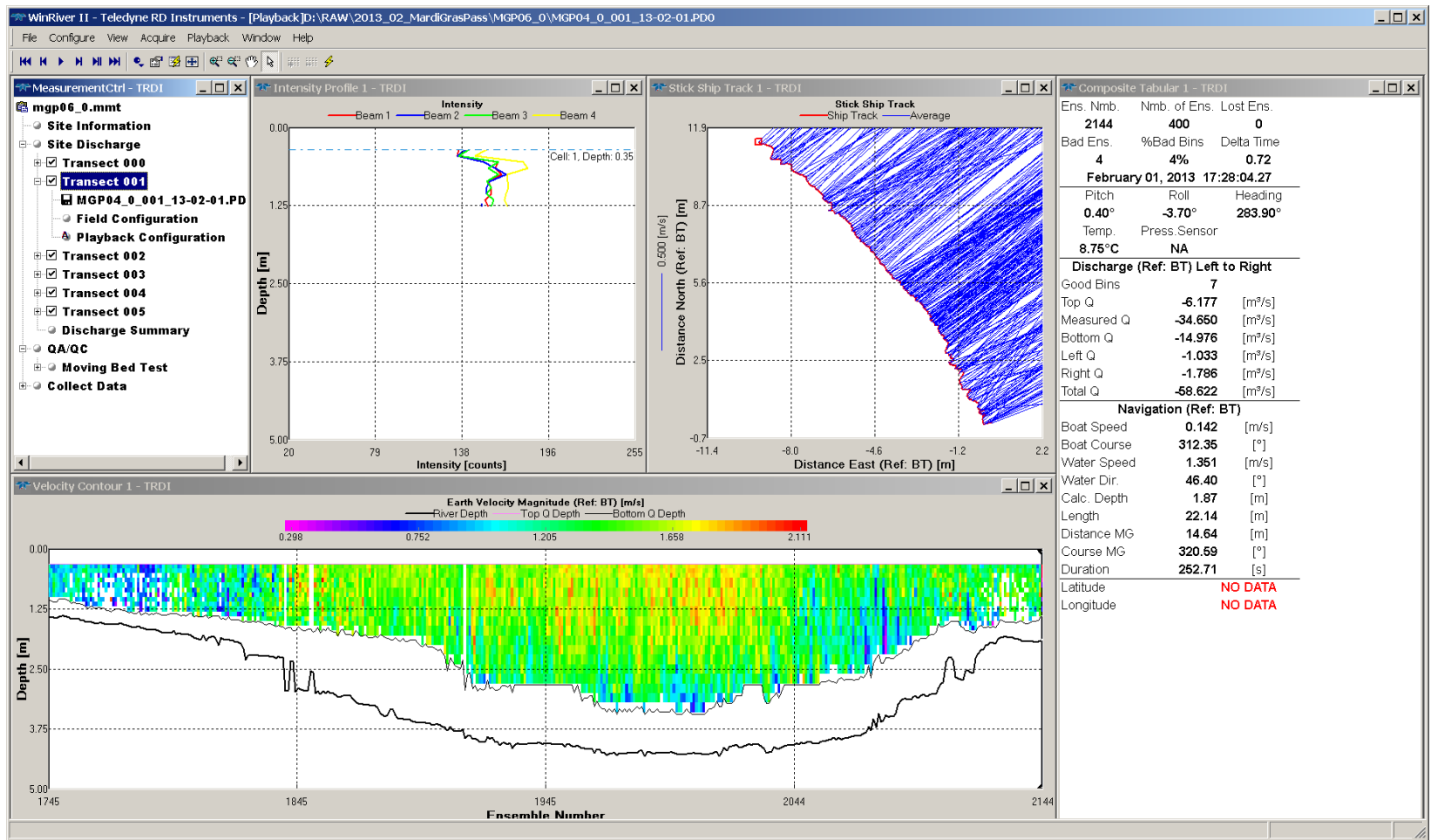


Fig. A1



Composite Tabular 1 - TRDI

Ens. Numb.	Nmb. of Ens.	Lost Ens.
2144	400	0
Bad Ens.	%Bad Bins	Delta Time
4	4%	0.72
February 01, 2013 17:28:04.27		
Pitch	Roll	Heading
0.40°	-3.70°	283.90°
Temp.	Press Sensor	
8.75°C	NA	
Discharge (Ref: BT) Left to Right		
Good Bins	7	
Top Q	-6.177	[m ³ /s]
Measured Q	-34.660	[m ³ /s]
Bottom Q	-14.976	[m ³ /s]
Left Q	-1.033	[m ³ /s]
Right Q	-1.786	[m ³ /s]
Total Q	-58.622	[m ³ /s]
Navigation (Ref: BT)		
Boat Speed	0.142	[m/s]
Boat Course	312.35	[°]
Water Speed	1.351	[m/s]
Water Dir.	46.40	[°]
Calc. Depth	1.87	[m]
Length	22.14	[m]
Distance MG	14.64	[m]
Course MG	320.59	[°]
Duration	252.71	[s]
Latitude	NO DATA	
Longitude	NO DATA	

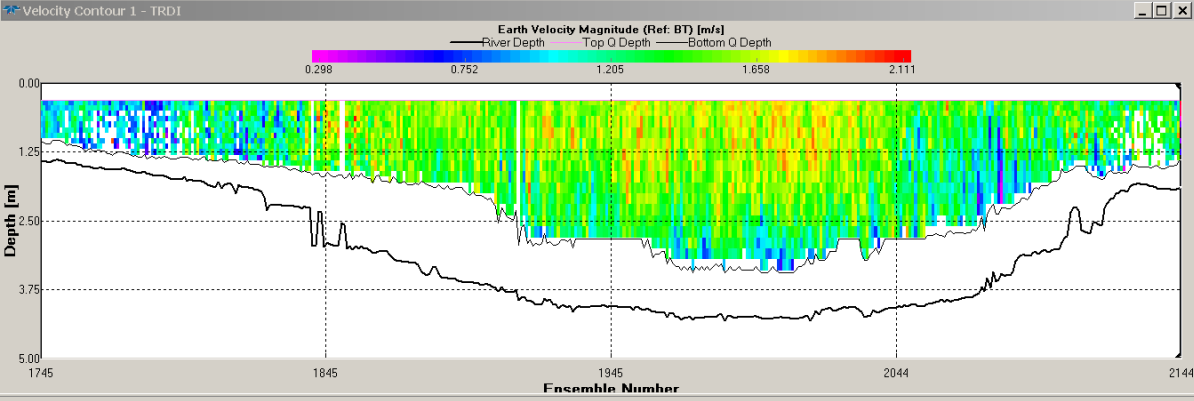


Fig. A2

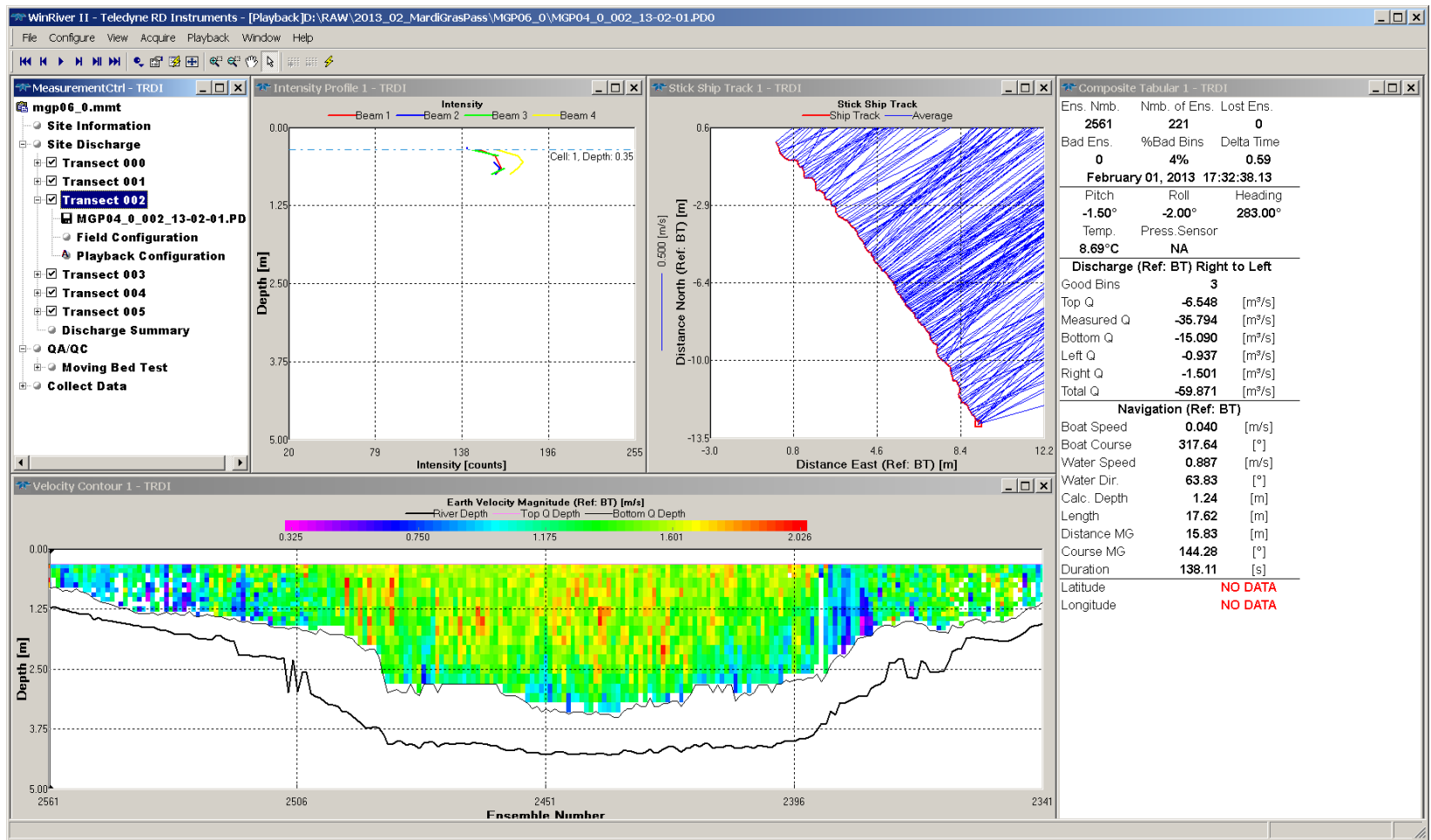


Fig. A3

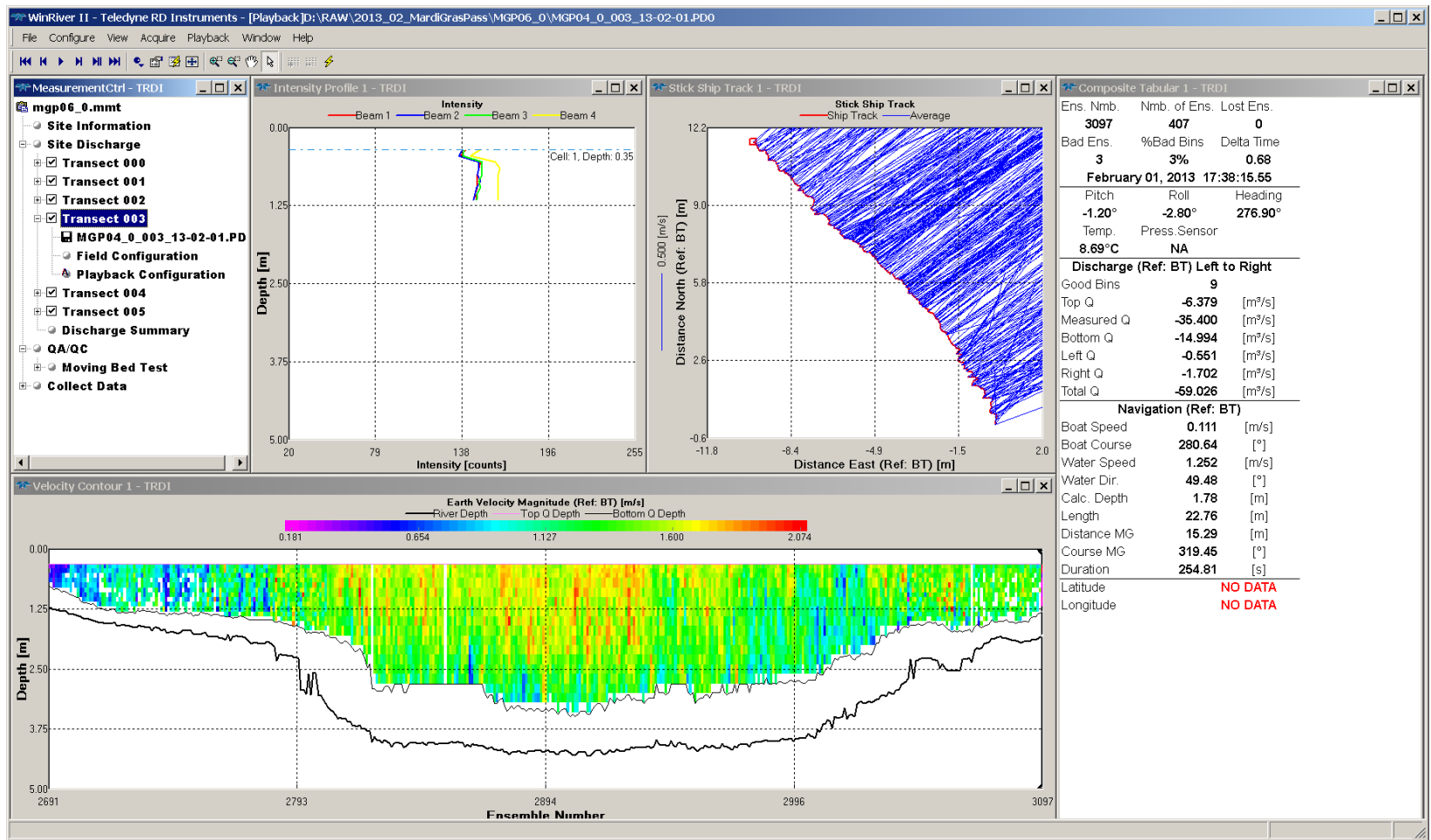
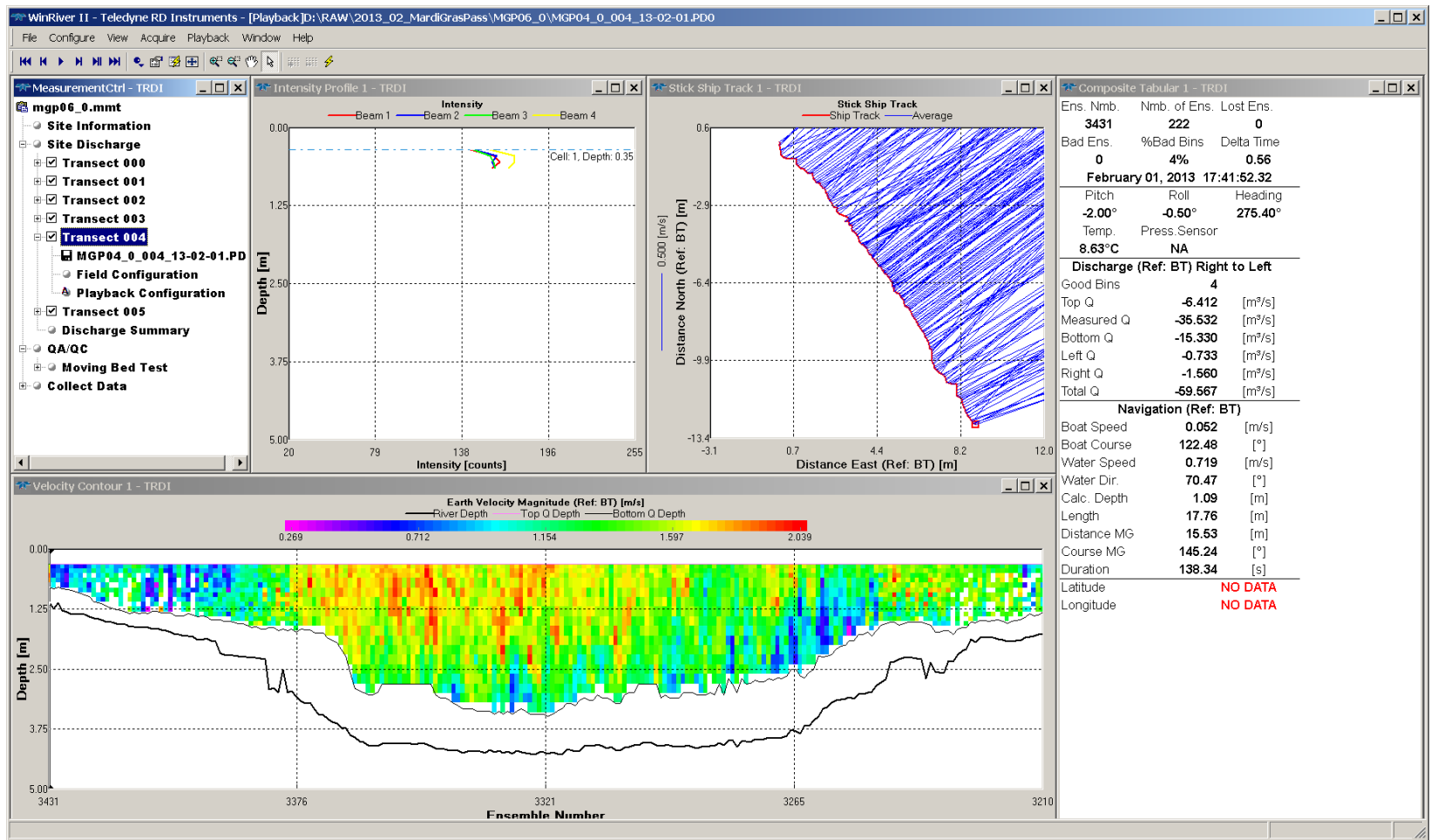


Fig. A4



Ens. Numb.	Nmb. of Ens.	Lost Ens.
3431	222	0
Bad Ens.	%Bad Bins	Delta Time
0	4%	0.56
February 01, 2013 17:41:52.32		
Pitch	Roll	Heading
-2.00°	-0.50°	275.40°
Temp.	Press Sensor	
8.63°C	NA	
Discharge (Ref: BT) Right to Left		
Good Bins	4	
Top Q	-6.412	[m ³ /s]
Measured Q	-35.532	[m ³ /s]
Bottom Q	-15.330	[m ³ /s]
Left Q	-0.733	[m ³ /s]
Right Q	-1.560	[m ³ /s]
Total Q	-59.567	[m ³ /s]
Navigation (Ref: BT)		
Boat Speed	0.052	[m/s]
Boat Course	122.48	[°]
Water Speed	0.719	[m/s]
Water Dir.	70.47	[°]
Calc. Depth	1.09	[m]
Length	17.76	[m]
Distance MG	15.53	[m]
Course MG	145.24	[°]
Duration	138.34	[s]
Latitude	NO DATA	
Longitude	NO DATA	

Fig. A5

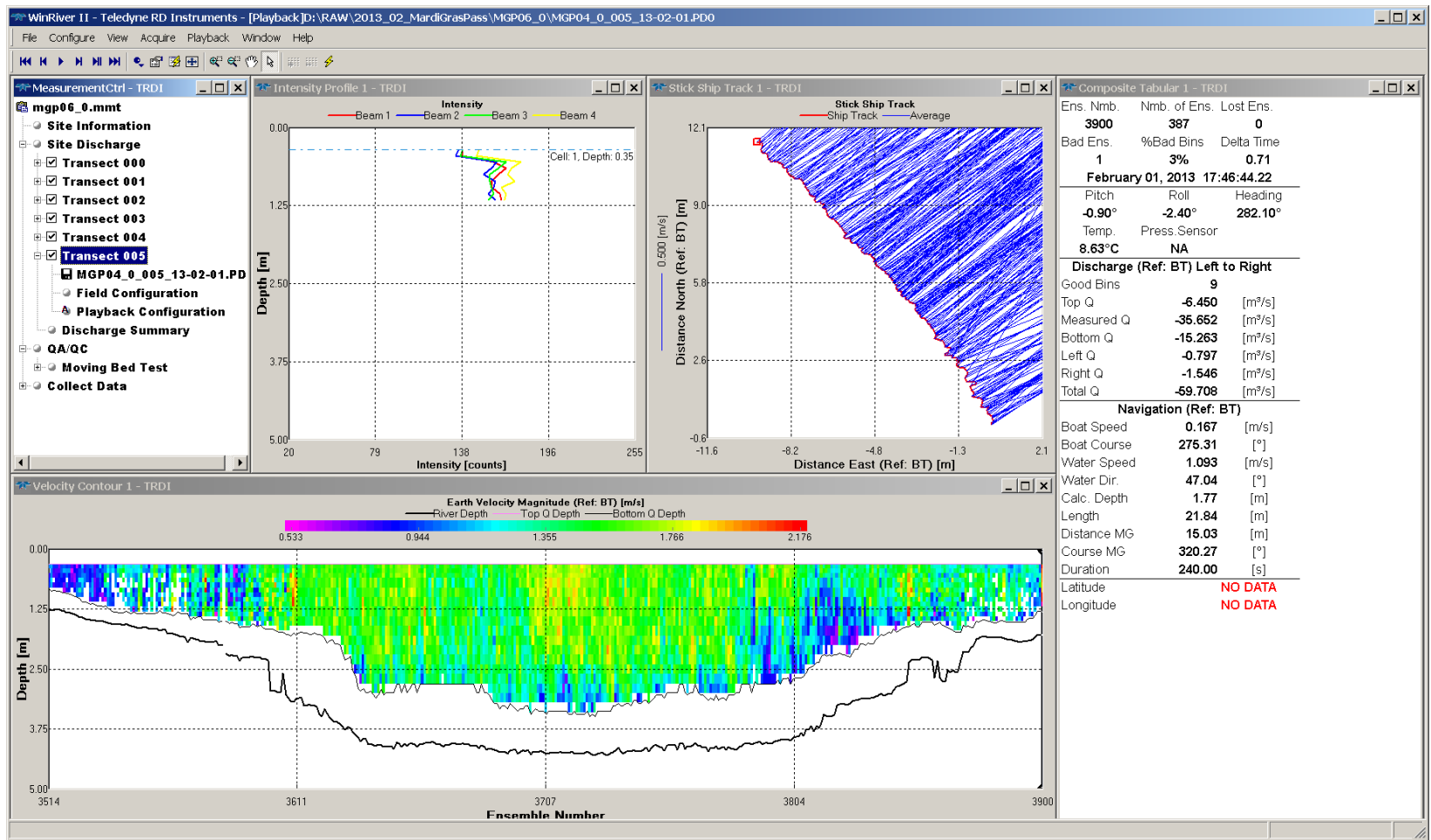


Fig. A6