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Discharge measurements of outflow culvert to Zuid-Willemsvaart in Maastricht

Control of theoretical discharges

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Discharge measurements of outflow culvert to Zuid-Willemsvaart in Maastricht

Control of theoretical discharges

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Abstract

In the scope of the International Commission of the Meuse, Flanders Hydraulics Research (FHR) is contributing to a low water measuring campaign on the watersystem of river Meuse at the Flemish border with the Walloon region and the Netherlands. The goal of this study is to quantify the amount of water that flows through the culverts to the Zuid-Willemsvaart in Maastricht via the so called “Voedingskanaal”. The detailed amount of flow through the outflow culverts is measured with a Streampro-ADCP, operated from the bridge 150m upstream of the culvert. The results of these measurements are compared with the QH-table used by Rijkswaterstaat and with a formula dated from 1873.

Results of the measurement indicate that for each tested opening level of the outflow culvert lower than or equal 0,59 m, the discharge in the QH-table lies within 1 standard deviation of the mean ADCP measured discharge, which is very good. For opening levels 0,69 m and 0,79 m, corresponding discharges of 17 m³/s and 19,5 m³/s respectively are suggested.

Compared to the formula from 1873, we conclude that the formula only works well up to opening level of 0,21 m. Above this value the formula underestimates the real discharge that is flowing through with increasing percentage, up to 23%.

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1 Introduction

In the scope of the International Commission of the Meuse, Flanders Hydraulics Research (FHR) is contributing to a low water measuring campaign on the watersystem of river Meuse at the Flemish border with the Walloon region and the Netherlands. This campaign is carried out together with the 3 responsible water managers: de Vlaamse Waterweg nv (dVW), Rijkswaterstaat Zuid-Nederland (RWS) and Service Public de Wallonie - Direction générale opérationnelle Mobilité et Voies hydrauliques (DGO2). The goal of this campaign is to quantify in detail the amount of water that is divided between the 3 water basins managers during periods of low flow.

The goal of this study is to quantify the amount of water that flows through the culverts to the Zuid-Willemsvaart in Maastricht via the so called "Voedingskanaal". Figure 1 to 5 shows an overview and some details of the structures used for the watermanagement.

Figure 1 – General situation Voedingskanaal and in- and outflowculverts (Source: Google Maps)

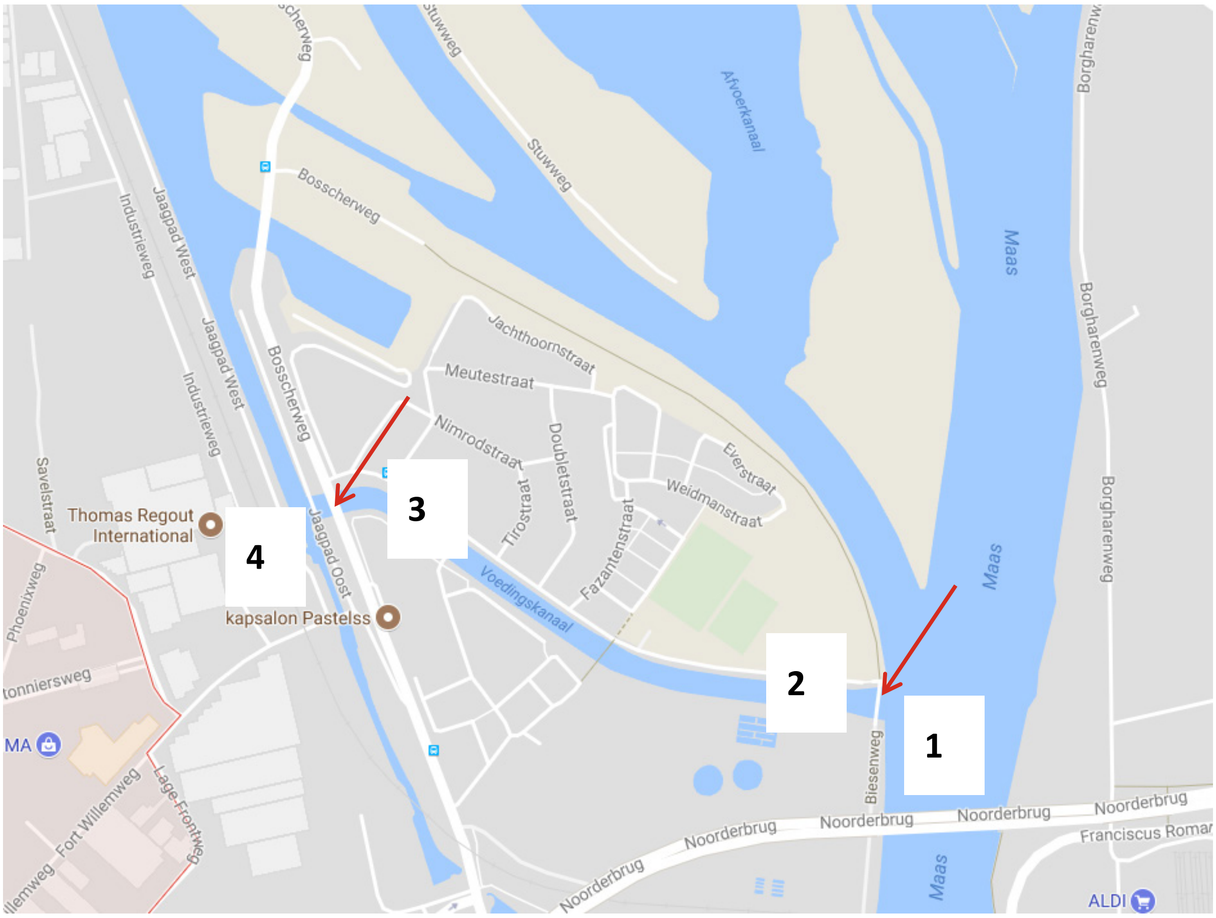


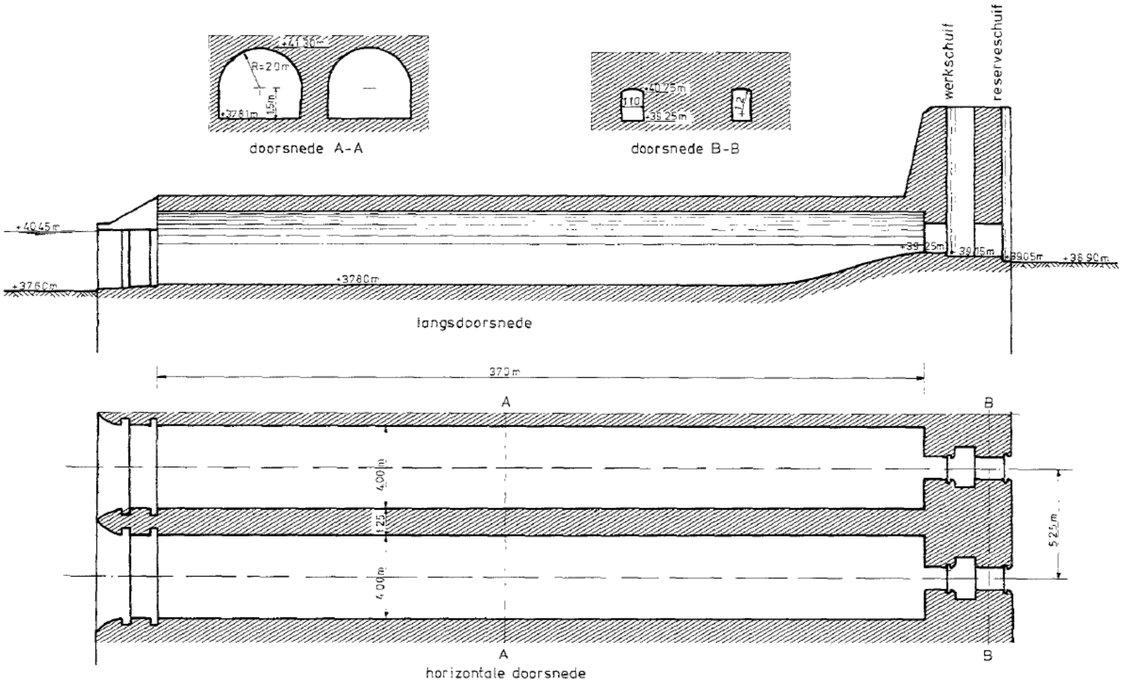
Figure 2 – location 1 of figure 1 (inflow side Meuse) (Source: white paper - Rijkswaterstaat)

Figure 3 – location 2 of figure 1 (inflow side Voedingskanaal) (Source: white paper - Rijkswaterstaat)

Figure 4 – location 3 of figure 1 (outflow side Voedingskanaal) (Source: white paper - Rijkswaterstaat)

Figure 5 – location 4 of figure 1 (outflow side Zuid-Willemsvaart) (Source: white paper - Rijkswaterstaat)

Figure 6 – dimensions of the outflow culvert (Source: white paper - Rijkswaterstaat)

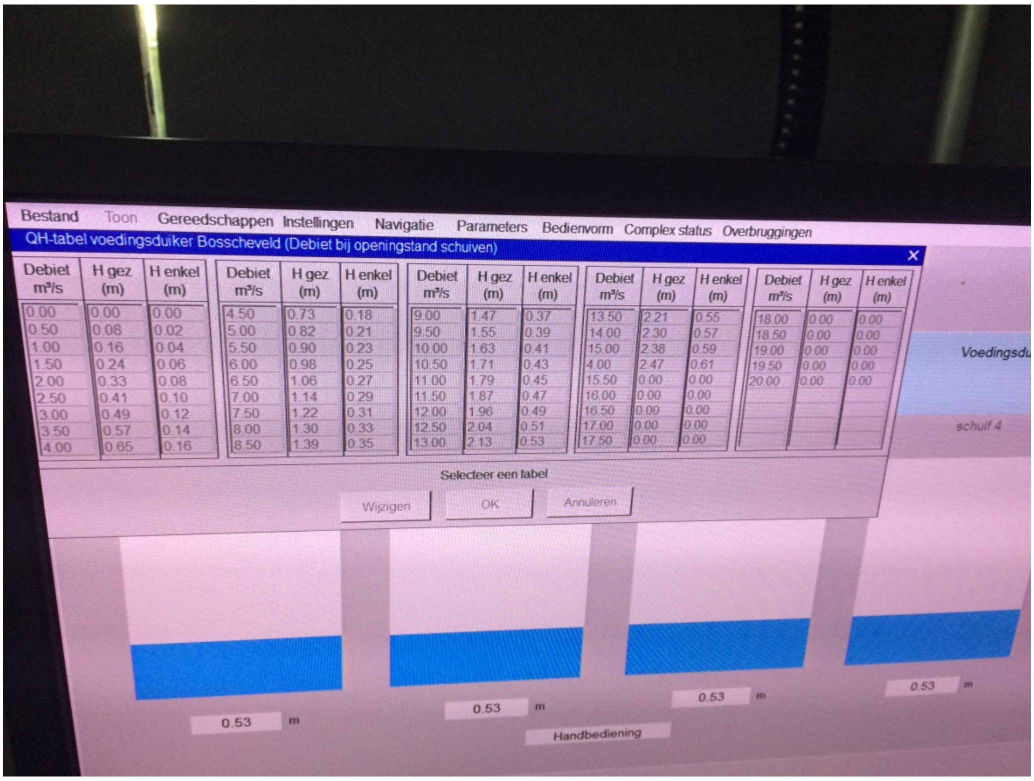


The water from the Meuse flows to the Voedingskanaal through the inflow-culverts (Figure 2 and 3). These culverts are open all the time except during high water. At that time they will be manually closed by turning the wheels. The outflow-culverts (Figure 4, 5 and 6) provides the water needed (varied between 19 – 8 m^3/s) for the Zuid-Willemsvaart as stated in the agreement between the Flemish and the Netherlands (1995). The opening of the culverts are manually operated at Maasbracht by RWS based upon the available discharge of that time:

- The opening/closing is based upon request from the Flemish River Information Services Hasselt (RIS) who indicate in their request how much discharge they wishes to get;
- The control room uses a Q-H table (figure 7) to decide the degree of opening of the doors;
- The doors of the different culverts are always at the same height.

The opening of the culverts is registered by the RWS operators when opening is changed.

Figure 7 – Q-H table for management of outflow to Zuid-Willemsvaart operated by RWS



QH-tabel voedingsduiker Bosscheveld (Debiet bij openingstand schuiven)

Debiet m³/s	H gez (m)	H enkel (m)	Debiet m³/s	H gez (m)	H enkel (m)	Debiet m³/s	H gez (m)	H enkel (m)	Debiet m³/s	H gez (m)	H enkel (m)	Debiet m³/s	H gez (m)	H enkel (m)
0.00	0.00	0.00	4.50	0.73	0.18	9.00	1.47	0.37	13.50	2.21	0.55	18.00	0.00	0.00
0.50	0.08	0.02	5.00	0.82	0.21	9.50	1.55	0.39	14.00	2.30	0.57	18.50	0.00	0.00
1.00	0.16	0.04	5.50	0.90	0.23	10.00	1.63	0.41	15.00	2.38	0.59	19.00	0.00	0.00
1.50	0.24	0.06	6.00	0.98	0.25	10.50	1.71	0.43	4.00	2.47	0.61	19.50	0.00	0.00
2.00	0.33	0.08	6.50	1.06	0.27	11.00	1.79	0.45	15.50	0.00	0.00	20.00	0.00	0.00
2.50	0.41	0.10	7.00	1.14	0.29	11.50	1.87	0.47	16.00	0.00	0.00			
3.00	0.49	0.12	7.50	1.22	0.31	12.00	1.96	0.49	16.50	0.00	0.00			
3.50	0.57	0.14	8.00	1.30	0.33	12.50	2.04	0.51	17.00	0.00	0.00			
4.00	0.65	0.16	8.50	1.39	0.35	13.00	2.13	0.53	17.50	0.00	0.00			

A detailed amount of the flow through the outflow culverts is measured with a Streampro-ADCP, operated from the bridge 150m upstream of the culvert (figure 8 and 9). Streampro ADCP measures current velocity and the related calculated discharge in streams from 30-400 cm in depth, while sailing a transectacross the stream towed from a bridge. A discharge measurement can be obtained at this location for every 2 or 3 minutes. Data is collected real-time and transmitted by a wireless data link to a handheld tablet. Technical specifications of Streampro ADCP are given in figure 10. The measurements were executed on 15/09/17 from 7 to 11u (UTC).

The results of the measurement will be compared with the QH-table from figure 7 and with a formula known at RWS and dated from 1873:

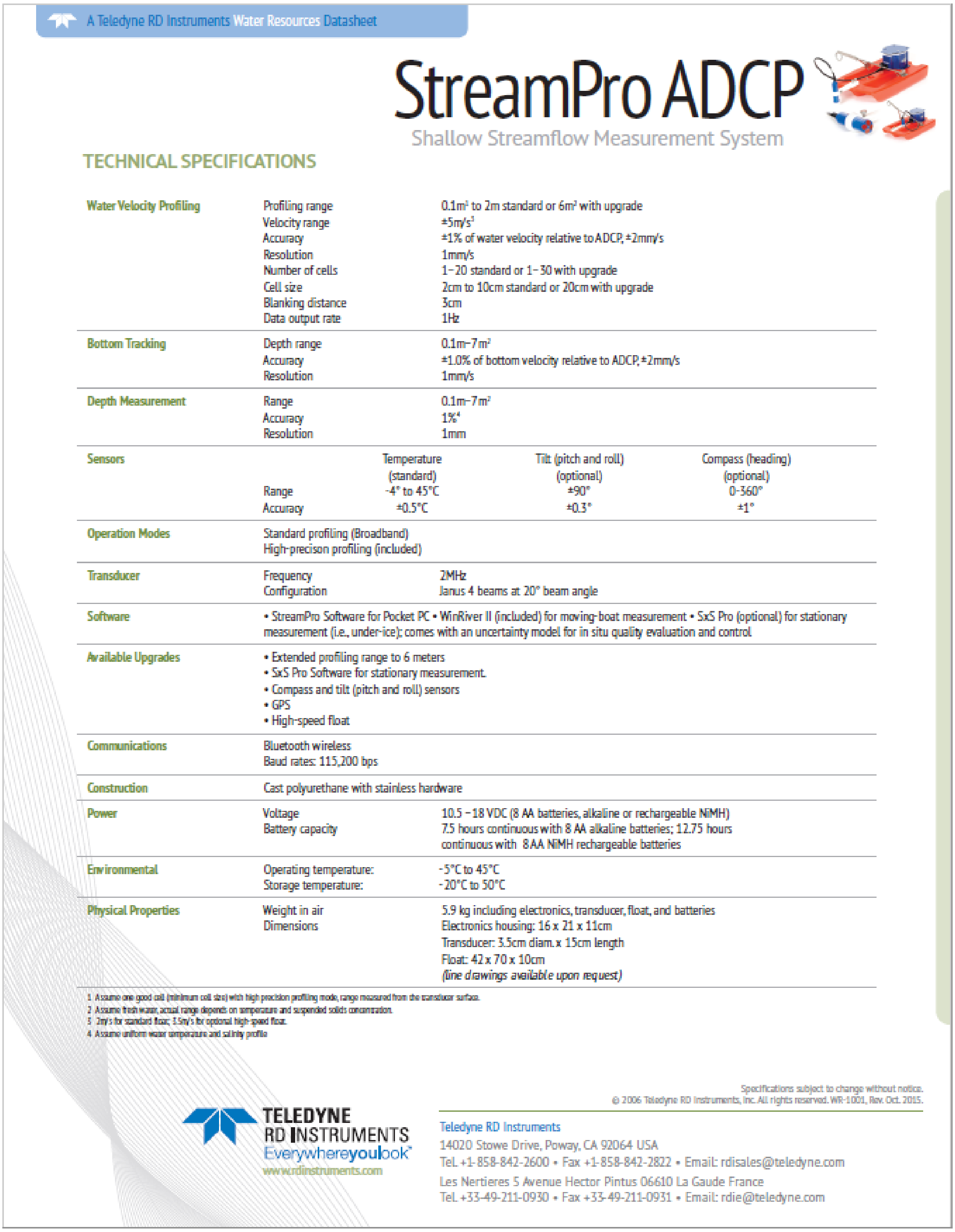
$$Q=0.66\times1.1\times a\times\sqrt{2g}\times\sqrt{\Delta},$$

with a the height of the opening in m, g = 9,81 m/s^2 and Δ the difference in level upstream and downstream of the culvert

Figure 8 – Detail situation culvert to Zuid-Willemsvaart and control measurement location (Source: Google Maps)

Figure 9 – Streampro ADCP operated on Voedingskanaal from bridge with details of instrument (Source: Google Maps – white paper - RD Instruments)

Figure 10 – Technical specs of Streampro ADCP (Source: white paper – RD Instruments)



A Teledyne RD Instruments Water Resources Datasheet

StreamPro ADCP

Shallow Streamflow Measurement System

TECHNICAL SPECIFICATIONS

Water Velocity Profiling	Profiling range	0.1m[1] to 2m standard or 6m[2] with upgrade
	Velocity range	±5m/s[3]
	Accuracy	±1% of water velocity relative to ADCP, ±2mm/s
	Resolution	1mm/s
	Number of cells	1–20 standard or 1–30 with upgrade
	Cell size	2cm to 10cm standard or 20cm with upgrade
	Blanking distance	3cm
	Data output rate	1Hz
Bottom Tracking	Depth range	0.1m–7m[2]
	Accuracy	±1.0% of bottom velocity relative to ADCP, ±2mm/s
	Resolution	1mm/s
Depth Measurement	Range	0.1m–7m[2]
	Accuracy	1%[4]
	Resolution	1mm

Sensors		Temperature (standard)	Tilt (pitch and roll) (optional)	Compass (heading) (optional)
	Range	-4° to 45°C	±90°	0-360°
	Accuracy	±0.5°C	±0.3°	±1°

Operation Modes	Standard profiling (Broadband) High-precison profiling (included)	
Transducer	Frequency	2MHz
	Configuration	Janus 4 beams at 20° beam angle
Software	• StreamPro Software for Pocket PC • WinRiver II (included) for moving-boat measurement • SxS Pro (optional) for stationary measurement (i.e., under-ice); comes with an uncertainty model for in situ quality evaluation and control	
Available Upgrades	• Extended profiling range to 6 meters • SxS Pro Software for stationary measurement. • Compass and tilt (pitch and roll) sensors • GPS • High-speed float	
Communications	Bluetooth wireless Baud rates: 115,200 bps	
Construction	Cast polyurethane with stainless hardware	
Power	Voltage	10.5 – 18 VDC (8 AA batteries, alkaline or rechargeable NiMH)
	Battery capacity	7.5 hours continuous with 8 AA alkaline batteries; 12.75 hours continuous with 8AA NiMH rechargeable batteries
Environmental	Operating temperature:	-5°C to 45°C
	Storage temperature:	-20°C to 50°C
Physical Properties	Weight in air	5.9 kg including electronics, transducer, float, and batteries
	Dimensions	Electronics housing: 16 x 21 x 11cm Transducer: 3.5cm diam. x 15cm length Float: 42 x 70 x 10cm *(line drawings available upon request)*

[1] Assume one good cell (minimum cell size) with high precision profiling mode, range measured from the transducer surface.
[2] Assume fresh water; actual range depends on temperature and suspended solids concentration.
[3] 2m/s for standard float; 3.5m/s for optional high-speed float.
[4] Assume uniform water temperature and salinity profile

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2 Results

2.1 Streampro ADCP measurements

At 15/09/17 from 7h to 11h (UTC) different transects were measured with Streampro ADCP from the bridge in Figure 9. Each 30 minutes the level of the opening of the culvert, expressed in m to a local reference, was changed (Table 1) by the operators of RWS, 10 minutes later ADCP measurements were started. Each opening was measured during 4-5 transects (12-18 minutes).

Table 2 gives an overview of the discharge in m³/s of the different transects that were measured with Streampro ADCP from the bridge on 15/09/17.

Table 1 – Settings of opening height of outflow culvert to Zuid-Willemsvaart as registered by RWS operators on 15/09/17

Time (UTC)	**Opening Level (m)**
7:00	Start campaign
7:00	0,21
7:30	0,31
8:00	0,41
8:30	0,51
9:00	0,59
9:30	0,69
10:00	0,79
10:30	End campaign

Table 2 – Streampro measurements during different opening heigths of outflow culvert to Zuid-Willemsvaart

Transect n°	**Date**	**Start (UTC)**	**End (UTC)**	**Q (m³/s)**	**Level opening culvert (m)**
4	15/09/2017	7:09:09	7:12:11	4,52	schuifstand 0.21
5	15/09/2017	7:12:46	7:15:59	4,13	schuifstand 0.21
6	15/09/2017	7:16:29	7:19:17	4,83	schuifstand 0.21
7	15/09/2017	7:19:53	7:22:47	5,52	schuifstand 0.21
8	15/09/2017	7:23:17	7:26:09	4,63	schuifstand 0.21

9	15/09/2017	7:39:13	7:41:45	6,27	schuifstand 0.31
10	15/09/2017	7:42:16	7:44:59	7,93	schuifstand 0.31
11	15/09/2017	7:45:30	7:48:00	7,05	schuifstand 0.31
12	15/09/2017	7:48:29	7:51:34	6,13	schuifstand 0.31
13	15/09/2017	7:52:04	7:55:09	7,44	schuifstand 0.31
14	15/09/2017	8:08:05	8:11:11	10,36	schuifstand 0.41
15	15/09/2017	8:11:41	8:14:52	9,56	schuifstand 0.41
16	15/09/2017	8:15:21	8:18:18	9,45	schuifstand 0.41
17	15/09/2017	8:18:51	8:21:44	9,56	schuifstand 0.41
18	15/09/2017	8:22:15	8:25:10	9,96	schuifstand 0.41
19	15/09/2017	8:38:24	8:41:02	11,9	schuifstand 0.51
20	15/09/2017	8:41:47	8:44:54	12,66	schuifstand 0.51
21	15/09/2017	8:45:24	8:48:21	11,97	schuifstand 0.51
22	15/09/2017	8:48:50	8:51:34	13,2	schuifstand 0.51
23	15/09/2017	8:52:04	8:55:15	12,79	schuifstand 0.51
24	15/09/2017	9:09:10	9:11:57	15,62	schuifstand 0.59
25	15/09/2017	9:12:27	9:15:06	15,06	schuifstand 0.59
26	15/09/2017	9:15:40	9:18:27	14,63	schuifstand 0.59
27	15/09/2017	9:18:55	9:21:40	13,97	schuifstand 0.59
28	15/09/2017	9:22:10	9:25:25	14,69	schuifstand 0.59
29	15/09/2017	9:44:21	9:46:56	16,79	schuifstand 0.69
30	15/09/2017	9:47:27	9:50:12	17,52	schuifstand 0.69
31	15/09/2017	9:50:42	9:53:29	17,41	schuifstand 0.69
32	15/09/2017	9:53:59	9:56:47	18,5	schuifstand 0.69
33	15/09/2017	10:11:24	10:13:43	20,2	schuifstand 0.79
34	15/09/2017	10:14:13	10:17:02	18,82	schuifstand 0.79
35	15/09/2017	10:17:31	10:20:13	19,43	schuifstand 0.79
36	15/09/2017	10:20:42	10:23:45	20,79	schuifstand 0.79

Figure 11 – Box plot of discharges measured at bridge over Voedingskanaal on 15/09/17 with Streampro ADCP at different opening levels of outflow culvert (stepwise from 0,21 to 0,79 m)

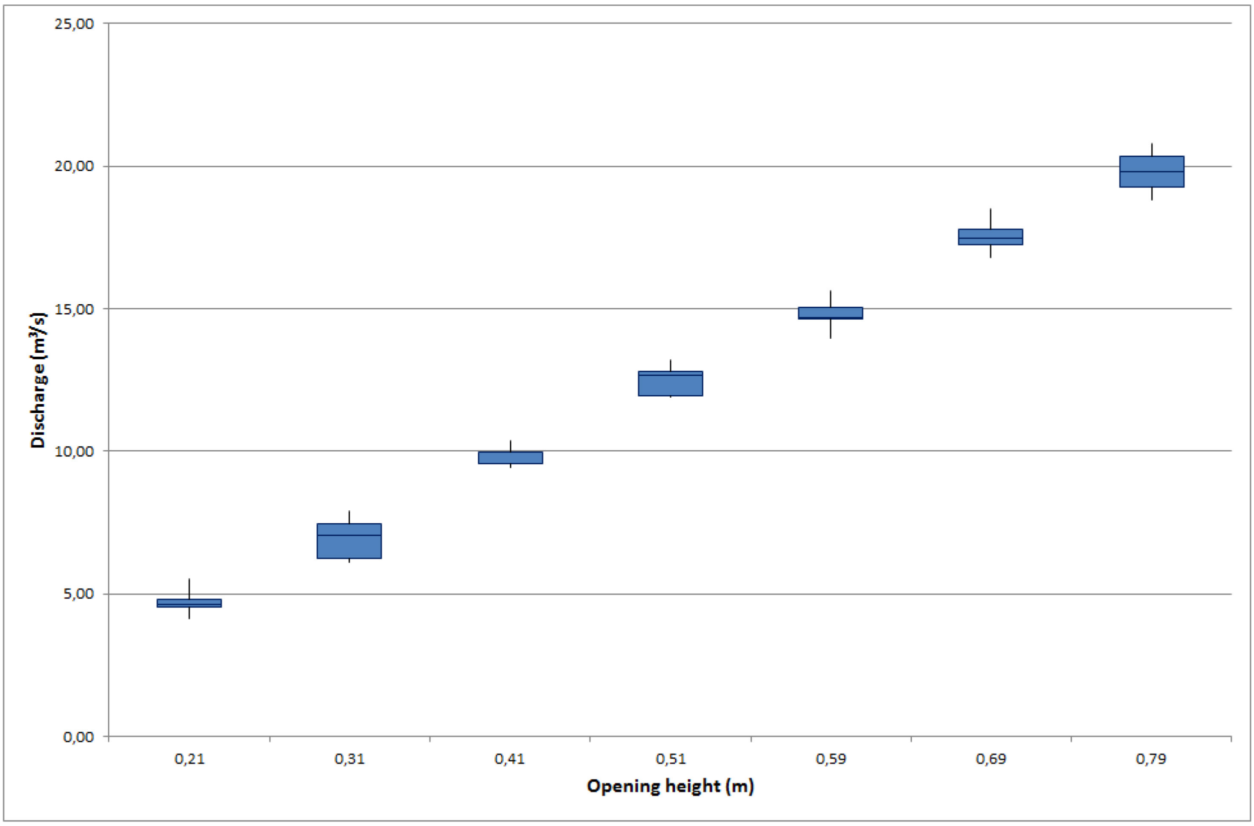


Table 3 – Simple statistics of results from measurements on 15/09/17 with Streampro ADCP at different opening heights of outflow culvert (0,21-0,79 m)

opening level (m)	mean Q (m³/s)	stdev (m³/s)
0,21	4,73	0,46
0,31	6,96	0,68
0,41	9,78	0,34
0,51	12,50	0,50
0,59	14,79	0,54
0,69	17,56	0,61
0,79	19,81	0,75

2.2 Comparison with QH-table and formula

2.2.1 QH-table from RWS operators

Table 4 shows the comparison between the ADCP measured discharges (m³/s) and the theoretical discharge stated in the table used by the RWS operators. Up till a 0,59 m opening level, each 10 cm increase of this opening corresponds to 2,5 m³/s extra flow.

Table 4 – comparison between ADCP measured discharges (m³/s) and theoretical discharges (m³/s) from QH-table of RWS operators

opening height (m)	**mean Q (m³/s)**	**stdev (m³/s)**	**QH table**
0,21	4,73	0,46	5
0,31	6,96	0,68	7,5
0,41	9,78	0,34	10
0,51	12,50	0,50	12,5
0,59	14,79	0,54	14,5 or 15?
0,69	17,56	0,61	-
0,79	19,81	0,75	-

We can conclude that the values of discharge stated in the QH-table of the RWS operators are validated as ‘correct’. For each tested opening level of the outflow culvert lower than or equal 0,59 m, the Q in the QH-table lies within 1 standard deviation of the mean ADCP measured discharge.

For opening height 0,69 m and 0,79 m no Q was found in the QH-table, so therefore no comparison was made. Based on the ADCP measurements at that time and the fact that 10 cm more opening level results in extra 2,5 m³/s, we suggest to put 17 m³/s and 19,5 m³/s respectively for opening height 0,69 m and 0,79 m.

2.2.2 Formula dated from 1873

Table 5 shows the comparison between the ADCP measured discharges (m³/s) and discharges derived by using the formula dated from 1873:

$$\boldsymbol{Q=0.66\times 1.1\times a\times\sqrt{2g}\times\sqrt{\Delta}},$$

with $\boldsymbol{a}$ the height of the opening in m, $\boldsymbol{g}$ = 9,81 m/s² and $\boldsymbol{\Delta}$ the difference in level upstream and downstream of the culvert, respectively waterlevel at Borgharen Julianakanaal and Zuidwillemsvaart.

Table 5 – Discharges (m³/s) through outflow culvert to Zuid-Willemsvaart derived by using the formula dated from 1873 at 15/09/17 from 7-10u30 (UTC)

Date	Hour (UTC)	H BHJK (mNAP)	H ZWV (mNAP)	Δ (cm)	a	Q formula (m³/s)
15/09/2017	7:00:00	44,14	40,39	37,5	0,21	4,14
15/09/2017	7:10:00	44,16	40,36	38,0	0,21	4,16
15/09/2017	7:20:00	44,16	40,34	38,2	0,21	4,17
15/09/2017	7:30:00	44,16	40,34	38,2	0,21	4,17
15/09/2017	7:40:00	44,15	40,39	37,6	0,31	6,11
15/09/2017	7:50:00	44,16	40,39	37,7	0,31	6,12
15/09/2017	8:00:00	44,14	40,36	37,8	0,31	6,13
15/09/2017	8:10:00	44,17	40,39	37,8	0,41	8,11
15/09/2017	8:20:00	44,17	40,38	37,9	0,41	8,12
15/09/2017	8:30:00	44,17	40,45	37,2	0,41	8,04
15/09/2017	8:40:00	44,14	40,42	37,2	0,51	10,00
15/09/2017	8:50:00	44,14	40,40	37,4	0,51	10,03
15/09/2017	9:00:00	44,14	40,38	37,6	0,51	10,06
15/09/2017	9:10:00	44,15	40,41	37,4	0,59	11,60
15/09/2017	9:20:00	44,15	40,40	37,5	0,59	11,62
15/09/2017	9:30:00	44,17	40,43	37,4	0,59	11,60
15/09/2017	9:40:00	44,15	40,41	37,4	0,69	13,57
15/09/2017	9:50:00	44,16	40,44	37,2	0,69	13,53
15/09/2017	10:00:00	44,16	40,45	37,1	0,69	13,52
15/09/2017	10:10:00	44,18	40,49	36,9	0,79	15,43
15/09/2017	10:20:00	44,16	40,48	36,8	0,79	15,41
15/09/2017	10:30:00	44,17	40,48	36,9	0,79	15,43

Table 6 – comparison between ADCP mean measured discharges (m³/s) and mean theoretical discharges (m³/s) based on the formula from 1873

opening height (m)	mean Q (m³/s)	QH formula (mean)	% difference in mean
0,21	4,73	4,16	-12%
0,31	6,96	6,12	-12%
0,41	9,78	8,09	-17%
0,51	12,50	10,03	-20%
0,59	14,79	11,61	-22%
0,69	17,56	13,54	-23%
0,79	19,81	15,43	-22%

Table 4 summarizes the comparison with the ADCP measured values. We can conclude that the formula underestimates the real discharge that is flowing trough with increasing percentage, starting with 12% at opening height of 0,21 m up to 23% at higher opening heights.

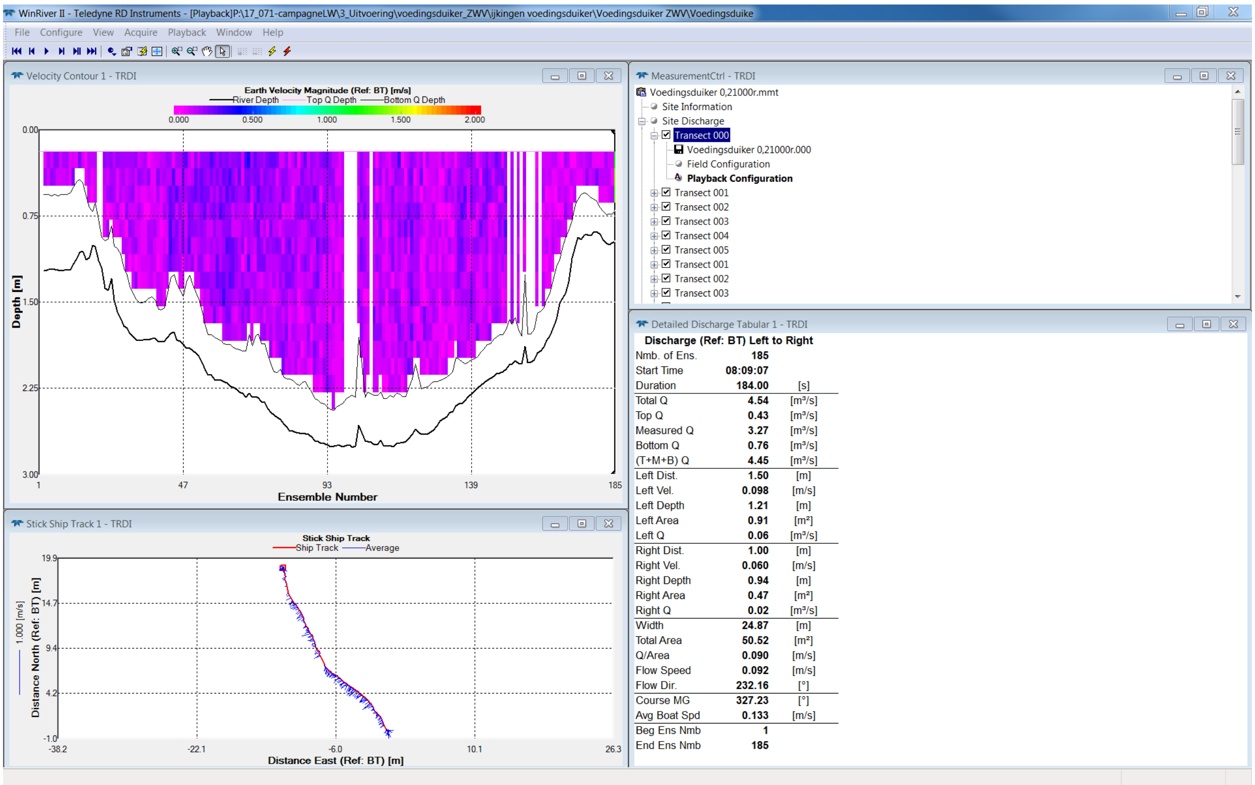
3 Conclusions

We can conclude that the discharges that flow through the outflow culverts of the Voedingskanaal to the Zuid-Willemsvaart in Maastricht, which are stated in the QH-table of the RWS operators, are realistic. For each tested opening height of the outflow culvert lower than or equal 0,59 m, the discharge in the QH-table lies within 1 standard deviation of the mean ADCP measured discharge. For opening height 0,69 m and 0,79 m, we suggest to put 17 m^3/s and 19,5 m^3/s respectively.

Compared to the formula from 1873, we conclude that the formula underestimates the real discharge that is flowing trough with increasing percentage, starting with 12% at lower opening heights up to 23% at higher opening heights.

4 Appendix

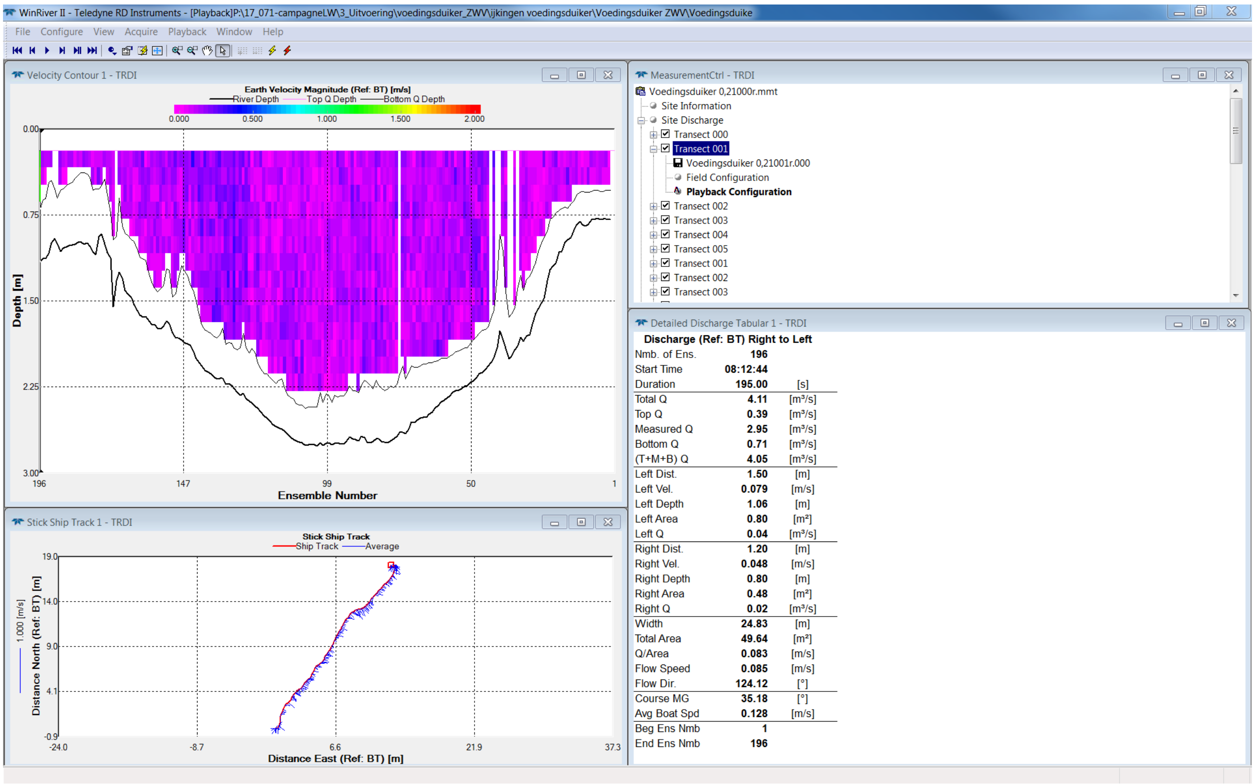
4.1 ADCP measurements at bridge upstream Voedingsduiker – Winriver output (time in UTC+1)



Voedingsduiker 0,21000r.mmt
- Site Information
- Site Discharge
  - ☑ Transect 000
    - Voedingsduiker 0,21000r.000
    - Field Configuration
    - **Playback Configuration**
  - ☑ Transect 001
  - ☑ Transect 002
  - ☑ Transect 003
  - ☑ Transect 004
  - ☑ Transect 005
  - ☑ Transect 001
  - ☑ Transect 002
  - ☑ Transect 003

Discharge (Ref: BT) Left to Right

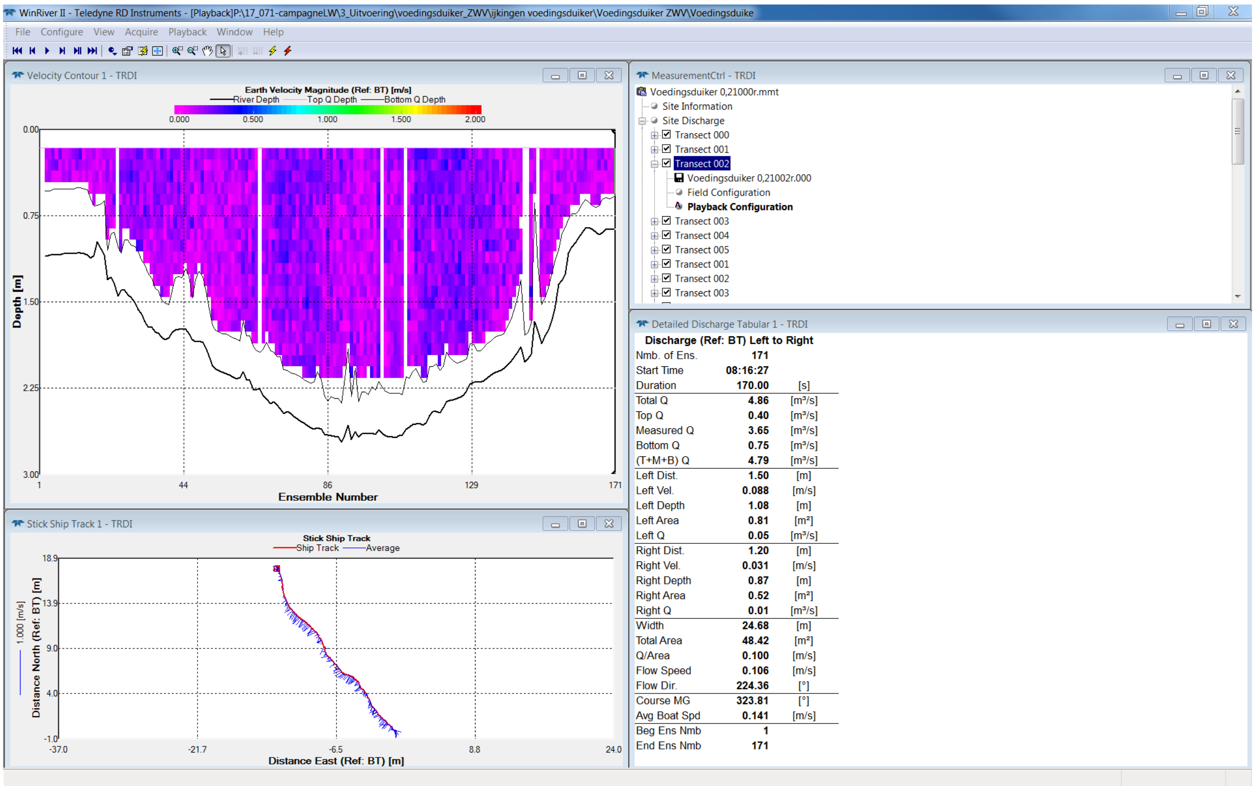
Nmb. of Ens.	**185**	
Start Time	**08:09:07**	
Duration	**184.00**	[s]
Total Q	**4.54**	[m³/s]
Top Q	**0.43**	[m³/s]
Measured Q	**3.27**	[m³/s]
Bottom Q	**0.76**	[m³/s]
(T+M+B) Q	**4.45**	[m³/s]
Left Dist.	**1.50**	[m]
Left Vel.	**0.098**	[m/s]
Left Depth	**1.21**	[m]
Left Area	**0.91**	[m²]
Left Q	**0.06**	[m³/s]
Right Dist.	**1.00**	[m]
Right Vel.	**0.060**	[m/s]
Right Depth	**0.94**	[m]
Right Area	**0.47**	[m²]
Right Q	**0.02**	[m³/s]
Width	**24.87**	[m]
Total Area	**50.52**	[m²]
Q/Area	**0.090**	[m/s]
Flow Speed	**0.092**	[m/s]
Flow Dir.	**232.16**	[°]
Course MG	**327.23**	[°]
Avg Boat Spd	**0.133**	[m/s]
Beg Ens Nmb	**1**	
End Ens Nmb	**185**	



Voedingsduiker 0,21000r.mmt
- Site Information
- Site Discharge
  - ☑ Transect 000
  - ☑ Transect 001
    - Voedingsduiker 0,21001r.000
    - Field Configuration
    - **Playback Configuration**
  - ☑ Transect 002
  - ☑ Transect 003
  - ☑ Transect 004
  - ☑ Transect 005
  - ☑ Transect 001
  - ☑ Transect 002
  - ☑ Transect 003

Discharge (Ref: BT) Right to Left

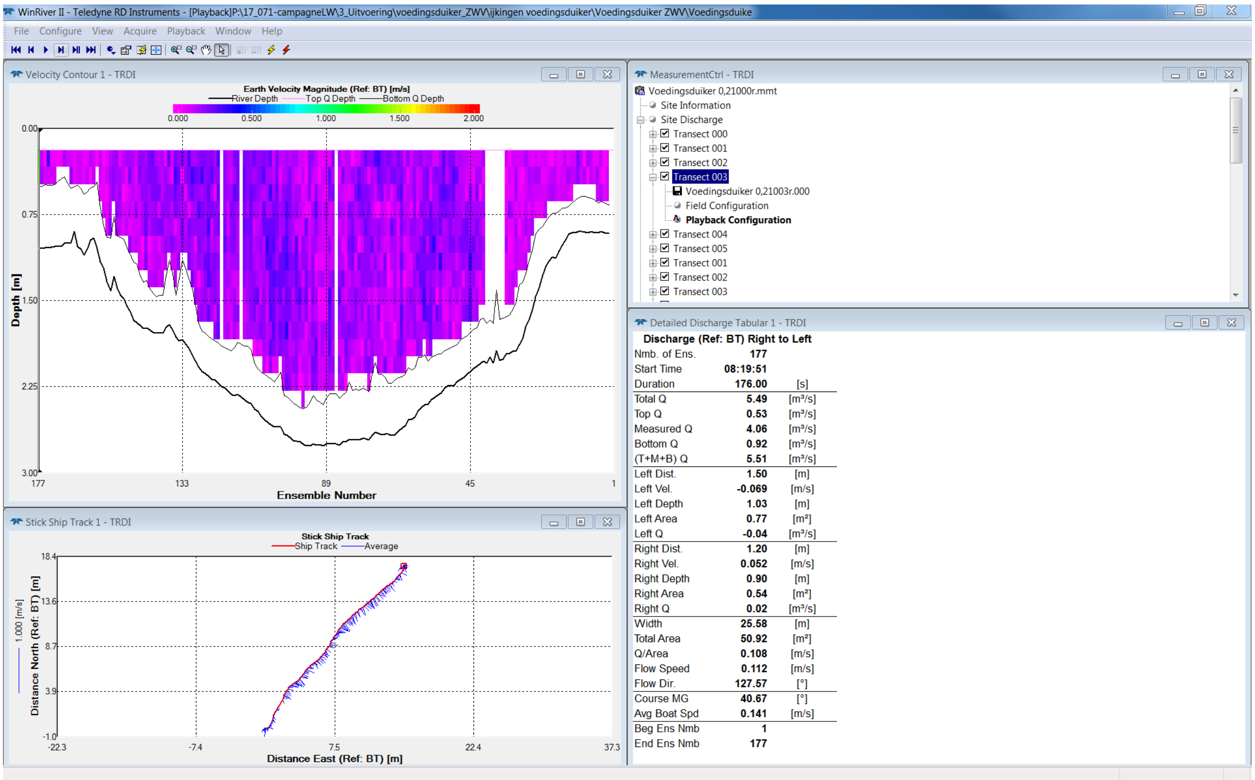
Nmb. of Ens.	**196**	
Start Time	**08:12:44**	
Duration	**195.00**	[s]
Total Q	**4.11**	[m³/s]
Top Q	**0.39**	[m³/s]
Measured Q	**2.95**	[m³/s]
Bottom Q	**0.71**	[m³/s]
(T+M+B) Q	**4.05**	[m³/s]
Left Dist.	**1.50**	[m]
Left Vel.	**0.079**	[m/s]
Left Depth	**1.06**	[m]
Left Area	**0.80**	[m²]
Left Q	**0.04**	[m³/s]
Right Dist.	**1.20**	[m]
Right Vel.	**0.048**	[m/s]
Right Depth	**0.80**	[m]
Right Area	**0.48**	[m²]
Right Q	**0.02**	[m³/s]
Width	**24.83**	[m]
Total Area	**49.64**	[m²]
Q/Area	**0.083**	[m/s]
Flow Speed	**0.085**	[m/s]
Flow Dir.	**124.12**	[°]
Course MG	**35.18**	[°]
Avg Boat Spd	**0.128**	[m/s]
Beg Ens Nmb	**1**	
End Ens Nmb	**196**	



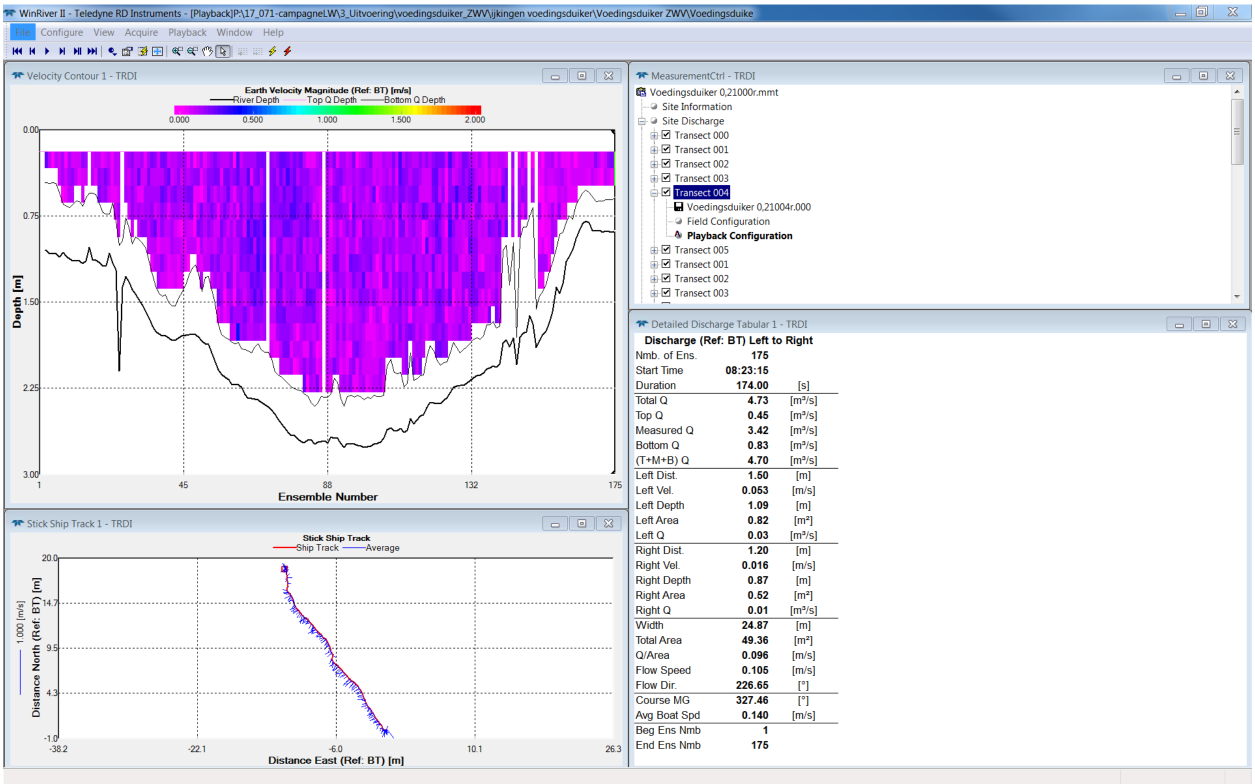
Voedingsduiker 0,21000r.mmt
- Site Information
- Site Discharge
  - ☑ Transect 000
  - ☑ Transect 001
  - ☑ Transect 002
    - Voedingsduiker 0,21002r.000
    - Field Configuration
    - **Playback Configuration**
  - ☑ Transect 003
  - ☑ Transect 004
  - ☑ Transect 005
  - ☑ Transect 001
  - ☑ Transect 002
  - ☑ Transect 003

Discharge (Ref: BT) Left to Right

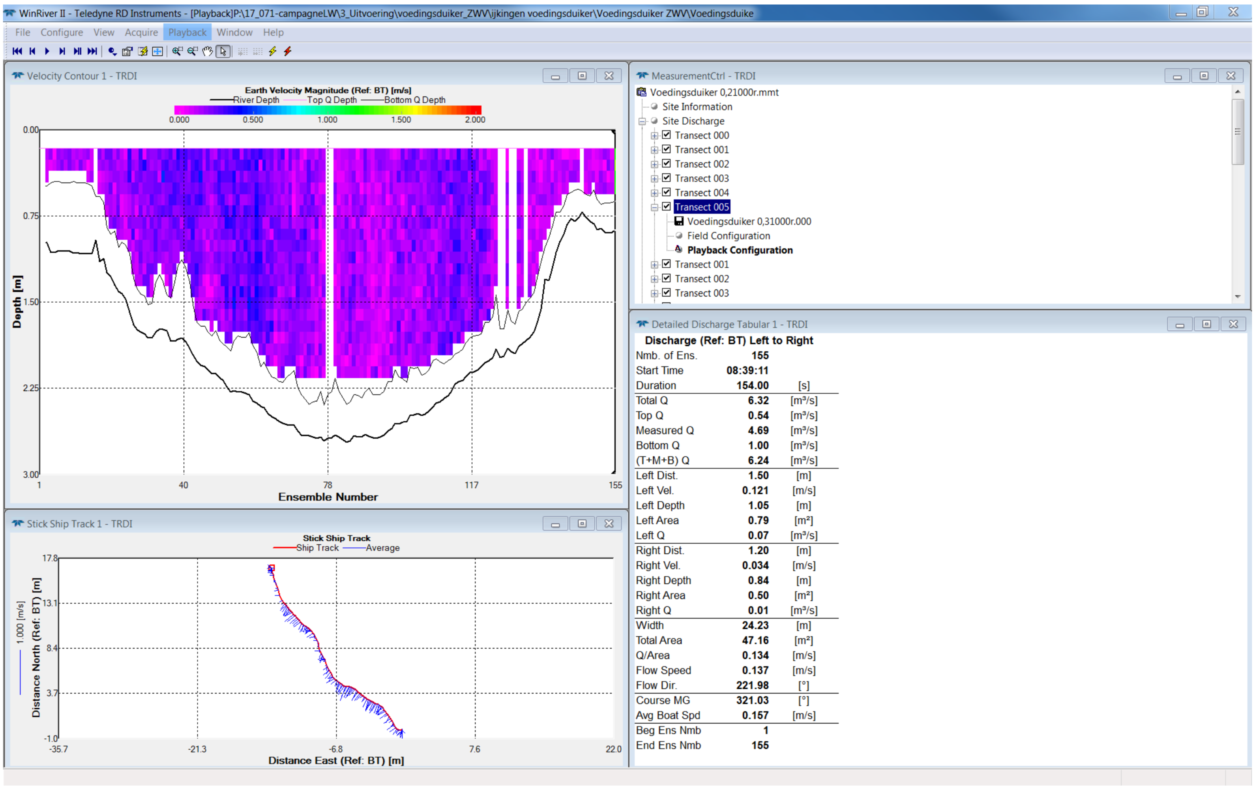
Nmb. of Ens.	**171**	
Start Time	**08:16:27**	
Duration	**170.00**	[s]
Total Q	**4.86**	[m³/s]
Top Q	**0.40**	[m³/s]
Measured Q	**3.65**	[m³/s]
Bottom Q	**0.75**	[m³/s]
(T+M+B) Q	**4.79**	[m³/s]
Left Dist.	**1.50**	[m]
Left Vel.	**0.088**	[m/s]
Left Depth	**1.08**	[m]
Left Area	**0.81**	[m²]
Left Q	**0.05**	[m³/s]
Right Dist.	**1.20**	[m]
Right Vel.	**0.031**	[m/s]
Right Depth	**0.87**	[m]
Right Area	**0.52**	[m²]
Right Q	**0.01**	[m³/s]
Width	**24.68**	[m]
Total Area	**48.42**	[m²]
Q/Area	**0.100**	[m/s]
Flow Speed	**0.106**	[m/s]
Flow Dir.	**224.36**	[°]
Course MG	**323.81**	[°]
Avg Boat Spd	**0.141**	[m/s]
Beg Ens Nmb	**1**	
End Ens Nmb	**171**	



```
 Discharge (Ref: BT) Right to Left
Nmb. of Ens.            177
Start Time         08:19:51
Duration             176.00      [s]
Total Q                5.49   [m³/s]
Top Q                  0.53   [m³/s]
Measured Q             4.06   [m³/s]
Bottom Q               0.92   [m³/s]
(T+M+B) Q              5.51   [m³/s]
Left Dist.             1.50      [m]
Left Vel.            -0.069    [m/s]
Left Depth             1.03      [m]
Left Area              0.77     [m²]
Left Q                -0.04   [m³/s]
Right Dist.            1.20      [m]
Right Vel.            0.052    [m/s]
Right Depth            0.90      [m]
Right Area             0.54     [m²]
Right Q                0.02   [m³/s]
Width                 25.58      [m]
Total Area            50.92     [m²]
Q/Area                0.108    [m/s]
Flow Speed            0.112    [m/s]
Flow Dir.            127.57      [°]
Course MG             40.67      [°]
Avg Boat Spd          0.141    [m/s]
Beg Ens Nmb               1
End Ens Nmb             177
```

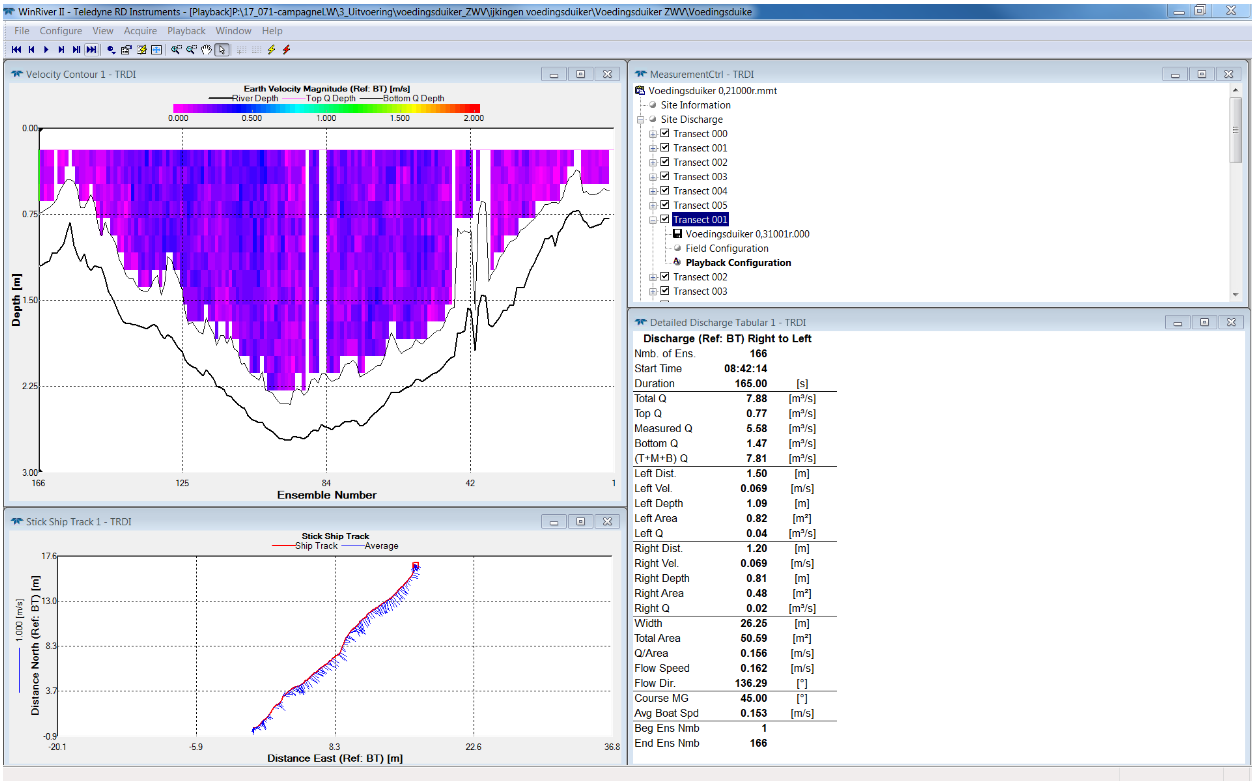


```
 Discharge (Ref: BT) Left to Right
Nmb. of Ens.            175
Start Time         08:23:15
Duration             174.00      [s]
Total Q                4.73   [m³/s]
Top Q                  0.45   [m³/s]
Measured Q             3.42   [m³/s]
Bottom Q               0.83   [m³/s]
(T+M+B) Q              4.70   [m³/s]
Left Dist.             1.50      [m]
Left Vel.             0.053    [m/s]
Left Depth             1.09      [m]
Left Area              0.82     [m²]
Left Q                 0.03   [m³/s]
Right Dist.            1.20      [m]
Right Vel.            0.016    [m/s]
Right Depth            0.87      [m]
Right Area             0.52     [m²]
Right Q                0.01   [m³/s]
Width                 24.87      [m]
Total Area            49.36     [m²]
Q/Area                0.096    [m/s]
Flow Speed            0.105    [m/s]
Flow Dir.            226.65      [°]
Course MG            327.46      [°]
Avg Boat Spd          0.140    [m/s]
Beg Ens Nmb               1
End Ens Nmb             175
```



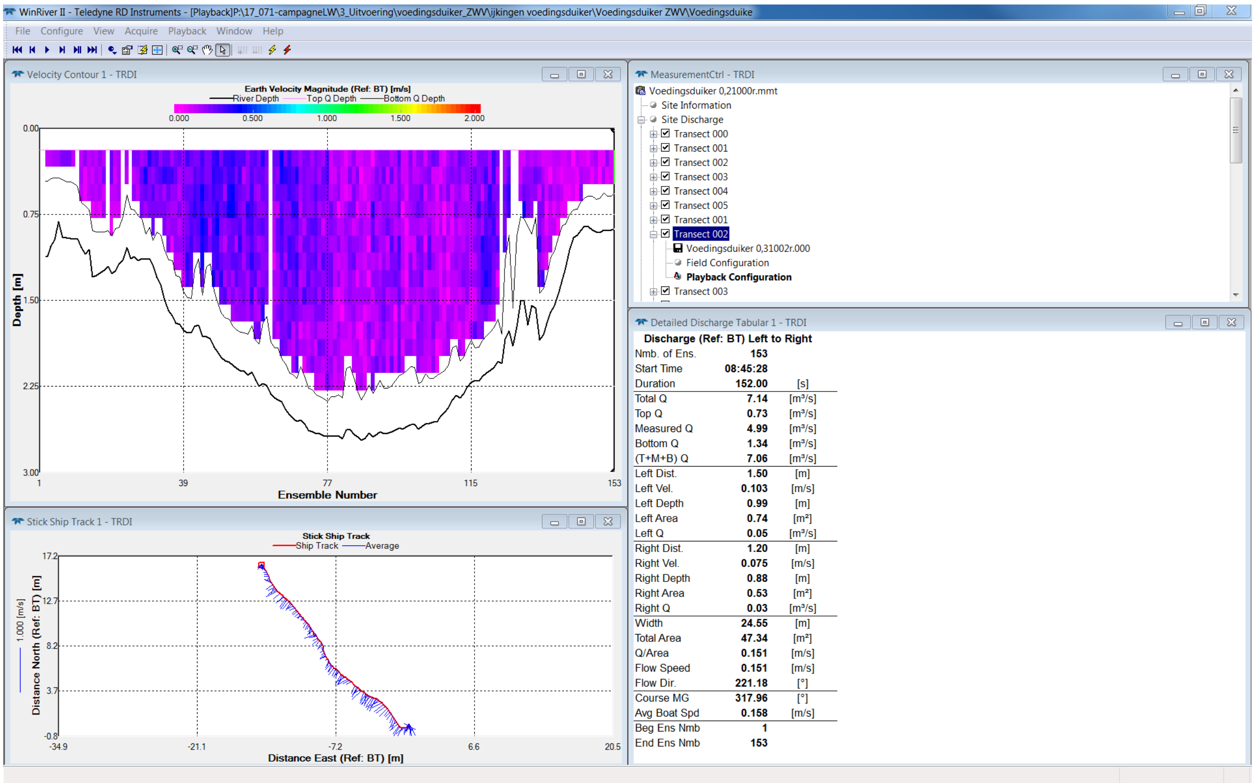
Discharge (Ref: BT) Left to Right

Nmb. of Ens.	155	
Start Time	08:39:11	
Duration	154.00	[s]
Total Q	6.32	[m³/s]
Top Q	0.54	[m³/s]
Measured Q	4.69	[m³/s]
Bottom Q	1.00	[m³/s]
(T+M+B) Q	6.24	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.121	[m/s]
Left Depth	1.05	[m]
Left Area	0.79	[m²]
Left Q	0.07	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.034	[m/s]
Right Depth	0.84	[m]
Right Area	0.50	[m²]
Right Q	0.01	[m³/s]
Width	24.23	[m]
Total Area	47.16	[m²]
Q/Area	0.134	[m/s]
Flow Speed	0.137	[m/s]
Flow Dir.	221.98	[°]
Course MG	321.03	[°]
Avg Boat Spd	0.157	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	155	



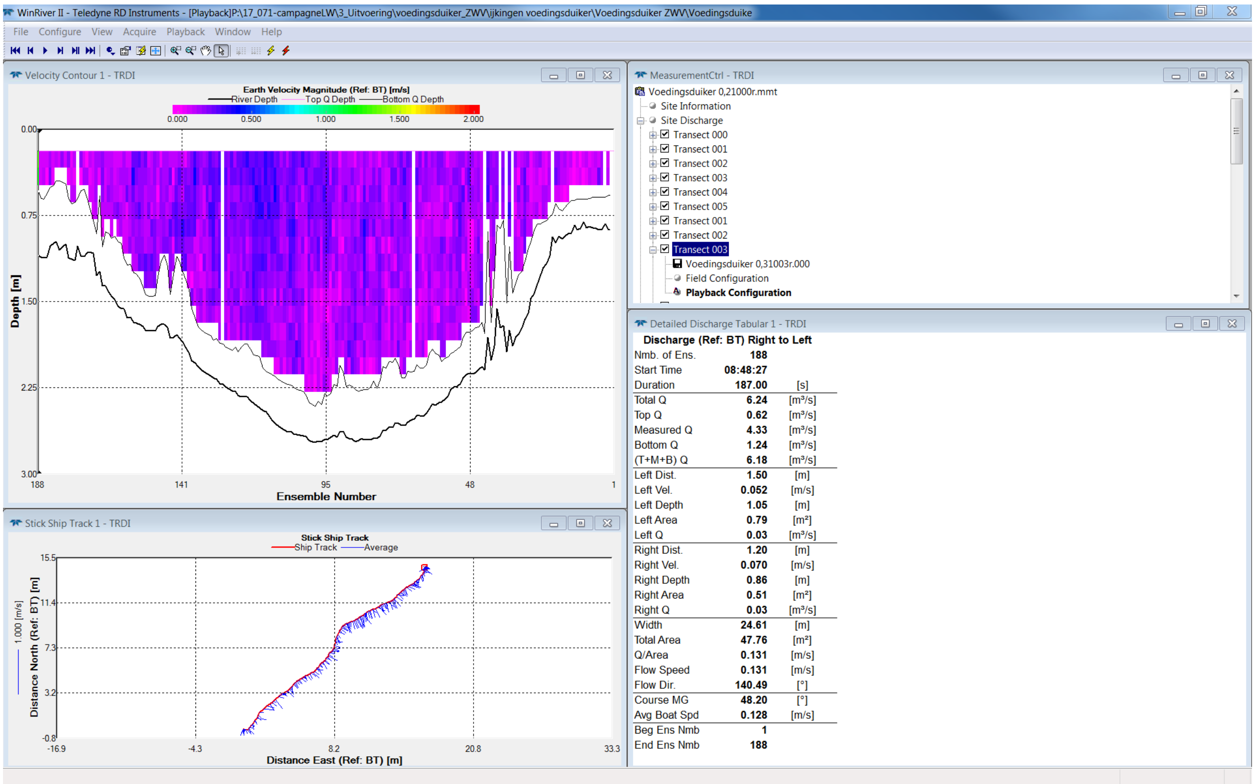
Discharge (Ref: BT) Right to Left

Nmb. of Ens.	166	
Start Time	08:42:14	
Duration	165.00	[s]
Total Q	7.88	[m³/s]
Top Q	0.77	[m³/s]
Measured Q	5.58	[m³/s]
Bottom Q	1.47	[m³/s]
(T+M+B) Q	7.81	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.069	[m/s]
Left Depth	1.09	[m]
Left Area	0.82	[m²]
Left Q	0.04	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.069	[m/s]
Right Depth	0.81	[m]
Right Area	0.48	[m²]
Right Q	0.02	[m³/s]
Width	26.25	[m]
Total Area	50.59	[m²]
Q/Area	0.156	[m/s]
Flow Speed	0.162	[m/s]
Flow Dir.	136.29	[°]
Course MG	45.00	[°]
Avg Boat Spd	0.153	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	166	



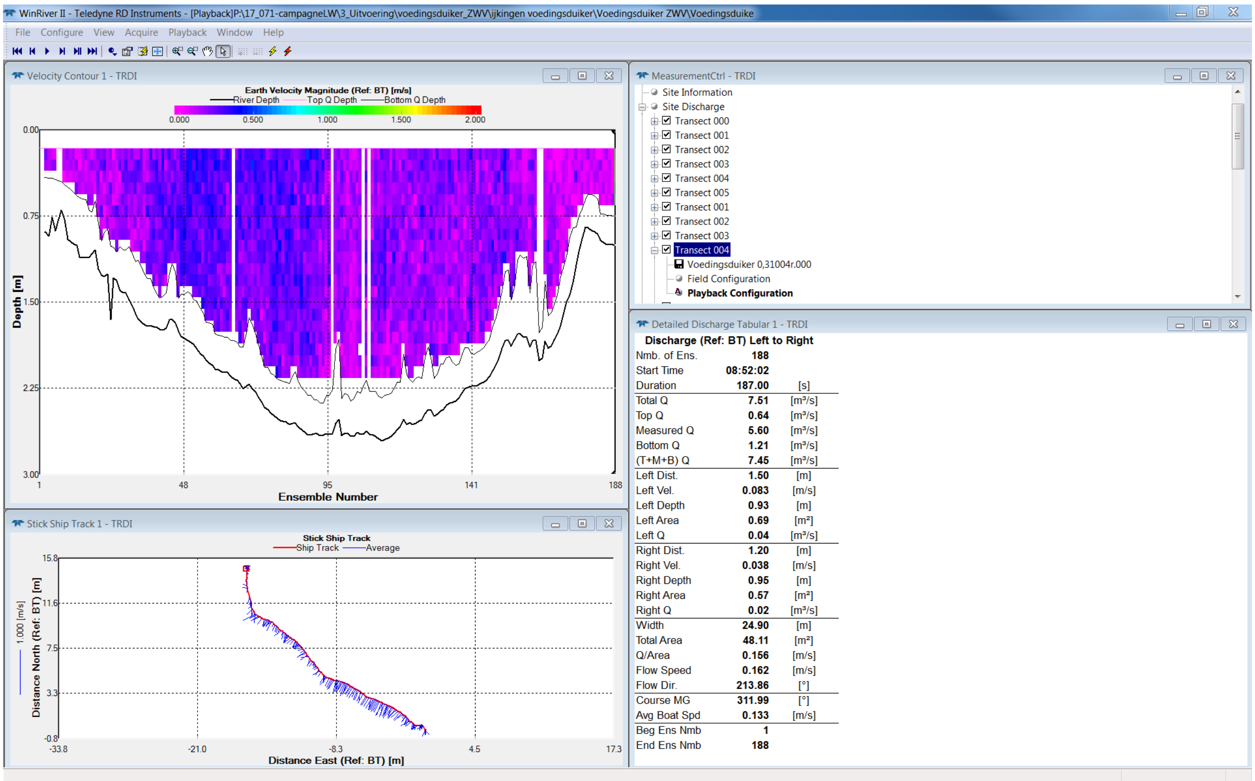
Discharge (Ref: BT) Left to Right

Nmb. of Ens.	153	
Start Time	08:45:28	
Duration	152.00	[s]
Total Q	7.14	[m³/s]
Top Q	0.73	[m³/s]
Measured Q	4.99	[m³/s]
Bottom Q	1.34	[m³/s]
(T+M+B) Q	7.06	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.103	[m/s]
Left Depth	0.99	[m]
Left Area	0.74	[m²]
Left Q	0.05	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.075	[m/s]
Right Depth	0.88	[m]
Right Area	0.53	[m²]
Right Q	0.03	[m³/s]
Width	24.55	[m]
Total Area	47.34	[m²]
Q/Area	0.151	[m/s]
Flow Speed	0.151	[m/s]
Flow Dir.	221.18	[°]
Course MG	317.96	[°]
Avg Boat Spd	0.158	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	153	



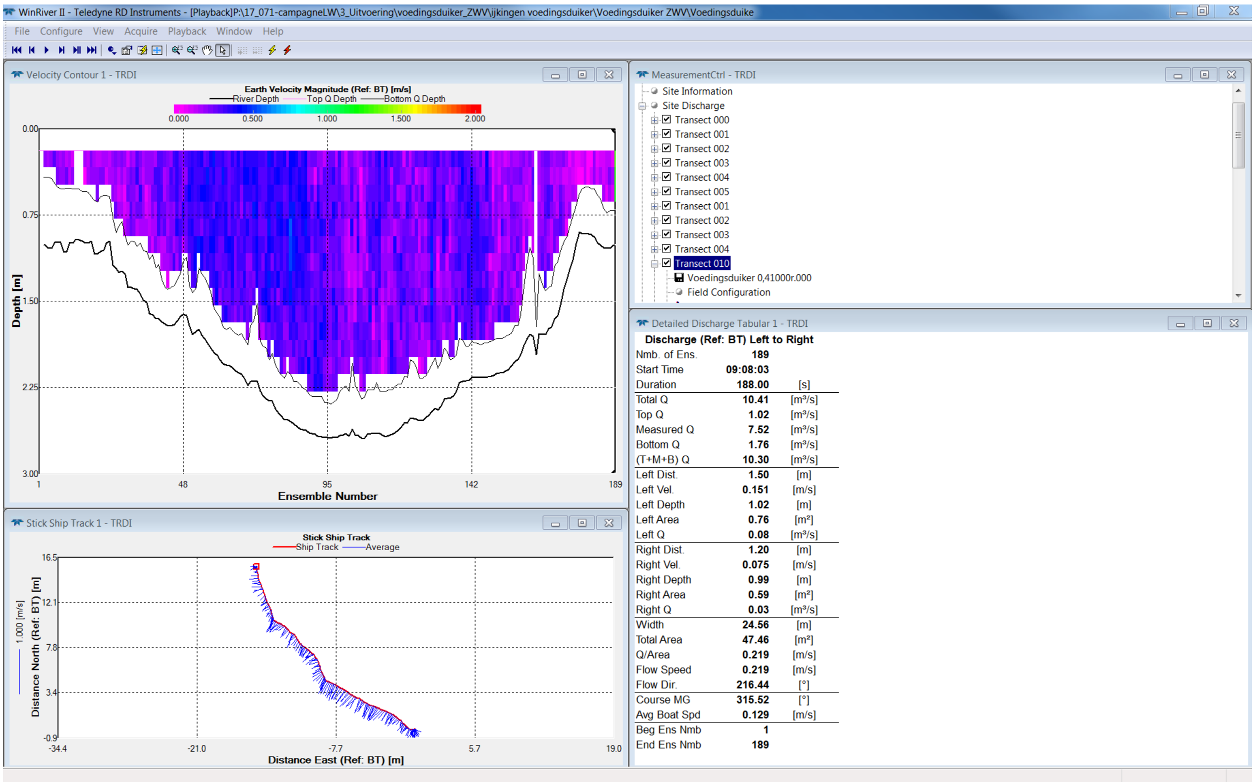
Discharge (Ref: BT) Right to Left

Nmb. of Ens.	188	
Start Time	08:48:27	
Duration	187.00	[s]
Total Q	6.24	[m³/s]
Top Q	0.62	[m³/s]
Measured Q	4.33	[m³/s]
Bottom Q	1.24	[m³/s]
(T+M+B) Q	6.18	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.052	[m/s]
Left Depth	1.05	[m]
Left Area	0.79	[m²]
Left Q	0.03	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.070	[m/s]
Right Depth	0.86	[m]
Right Area	0.51	[m²]
Right Q	0.03	[m³/s]
Width	24.61	[m]
Total Area	47.76	[m²]
Q/Area	0.131	[m/s]
Flow Speed	0.131	[m/s]
Flow Dir.	140.49	[°]
Course MG	48.20	[°]
Avg Boat Spd	0.128	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	188	



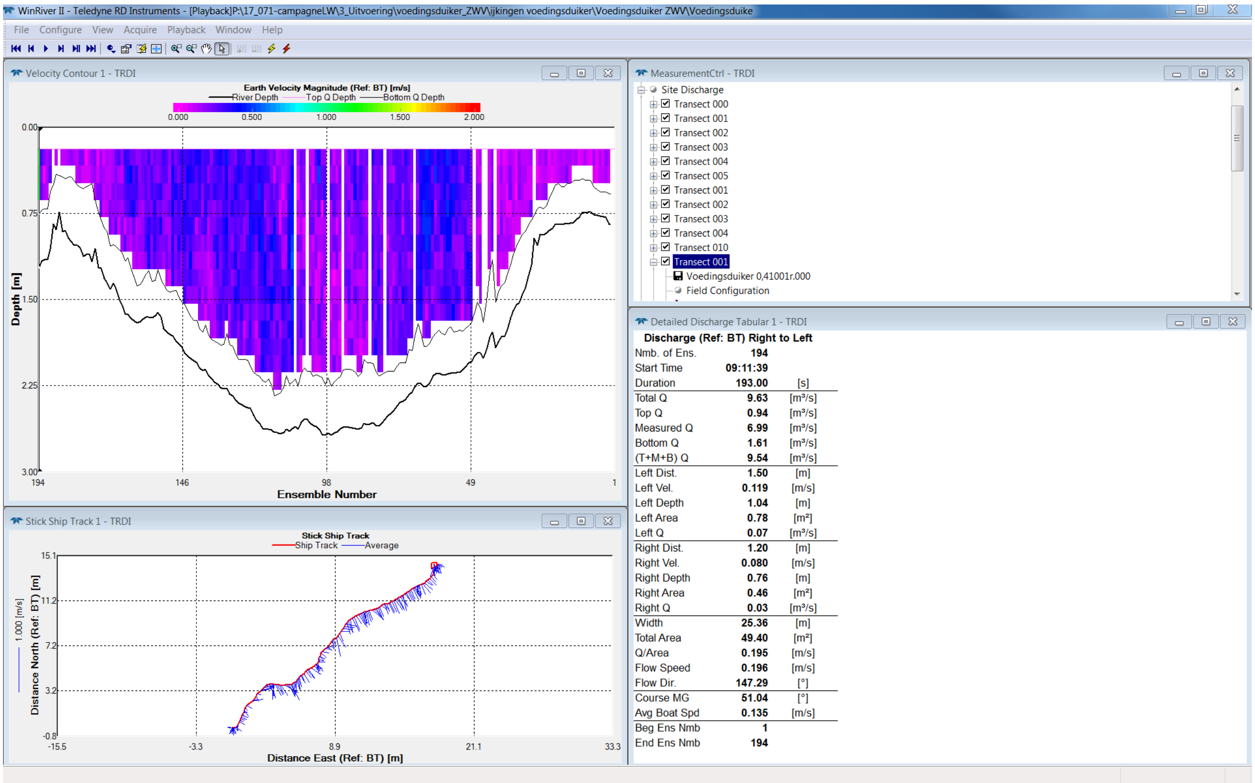
Discharge (Ref: BT) Left to Right

Nmb. of Ens.	188	
Start Time	08:52:02	
Duration	187.00	[s]
Total Q	7.51	[m³/s]
Top Q	0.64	[m³/s]
Measured Q	5.60	[m³/s]
Bottom Q	1.21	[m³/s]
(T+M+B) Q	7.45	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.083	[m/s]
Left Depth	0.93	[m]
Left Area	0.69	[m²]
Left Q	0.04	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.038	[m/s]
Right Depth	0.95	[m]
Right Area	0.57	[m²]
Right Q	0.02	[m³/s]
Width	24.90	[m]
Total Area	48.11	[m²]
Q/Area	0.156	[m/s]
Flow Speed	0.162	[m/s]
Flow Dir.	213.86	[°]
Course MG	311.99	[°]
Avg Boat Spd	0.133	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	188	



Discharge (Ref: BT) Left to Right

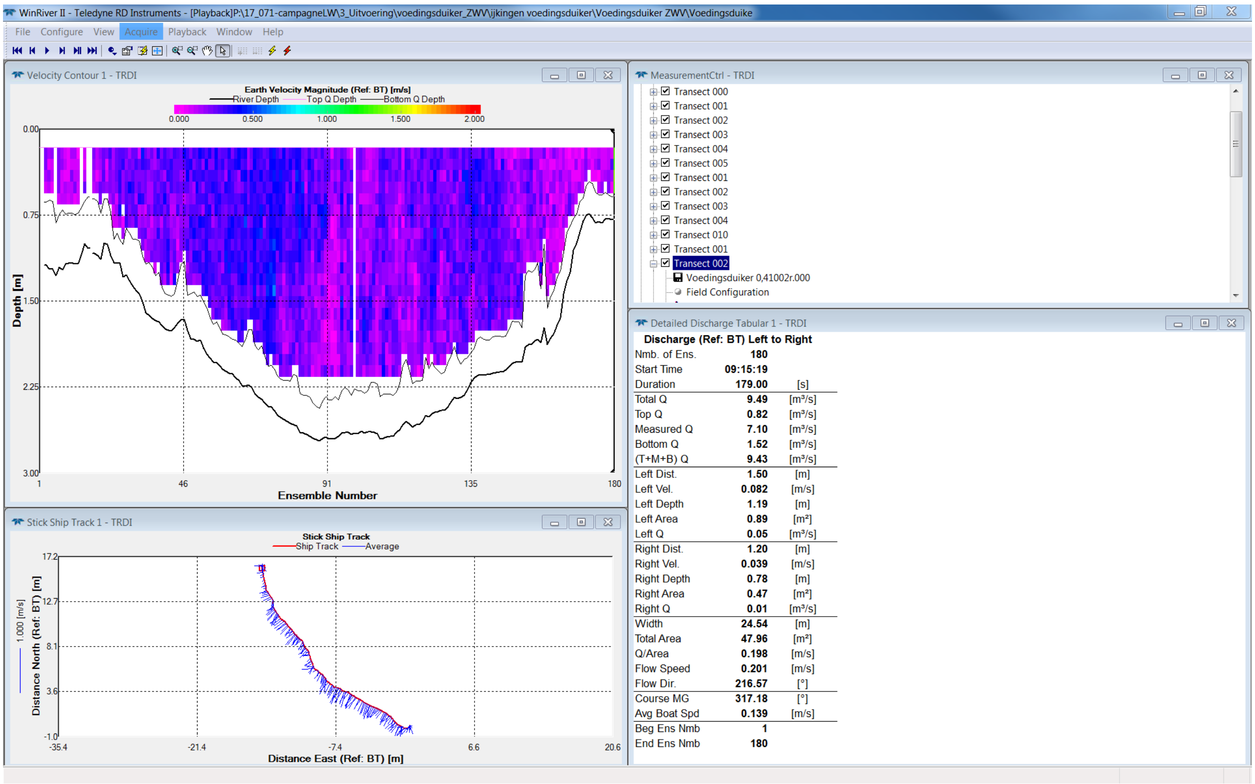
Nmb. of Ens.	189	
Start Time	09:08:03	
Duration	188.00	[s]
Total Q	10.41	[m³/s]
Top Q	1.02	[m³/s]
Measured Q	7.52	[m³/s]
Bottom Q	1.76	[m³/s]
(T+M+B) Q	10.30	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.151	[m/s]
Left Depth	1.02	[m]
Left Area	0.76	[m²]
Left Q	0.08	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.075	[m/s]
Right Depth	0.99	[m]
Right Area	0.59	[m²]
Right Q	0.03	[m³/s]
Width	24.56	[m]
Total Area	47.46	[m²]
Q/Area	0.219	[m/s]
Flow Speed	0.219	[m/s]
Flow Dir.	216.44	[°]
Course MG	315.52	[°]
Avg Boat Spd	0.129	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	189	



Site Discharge
☑ Transect 000
☑ Transect 001
☑ Transect 002
☑ Transect 003
☑ Transect 004
☑ Transect 005
☑ Transect 001
☑ Transect 002
☑ Transect 003
☑ Transect 004
☑ Transect 010
☑ Transect 001
Voedingsduiker 0,41001r.000
Field Configuration

Discharge (Ref: BT) Right to Left

Nmb. of Ens.	194	
Start Time	09:11:39	
Duration	193.00	[s]
Total Q	9.63	[m³/s]
Top Q	0.94	[m³/s]
Measured Q	6.99	[m³/s]
Bottom Q	1.61	[m³/s]
(T+M+B) Q	9.54	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.119	[m/s]
Left Depth	1.04	[m]
Left Area	0.78	[m²]
Left Q	0.07	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.080	[m/s]
Right Depth	0.76	[m]
Right Area	0.46	[m²]
Right Q	0.03	[m³/s]
Width	25.36	[m]
Total Area	49.40	[m²]
Q/Area	0.195	[m/s]
Flow Speed	0.196	[m/s]
Flow Dir.	147.29	[°]
Course MG	51.04	[°]
Avg Boat Spd	0.135	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	194	



☑ Transect 000
☑ Transect 001
☑ Transect 002
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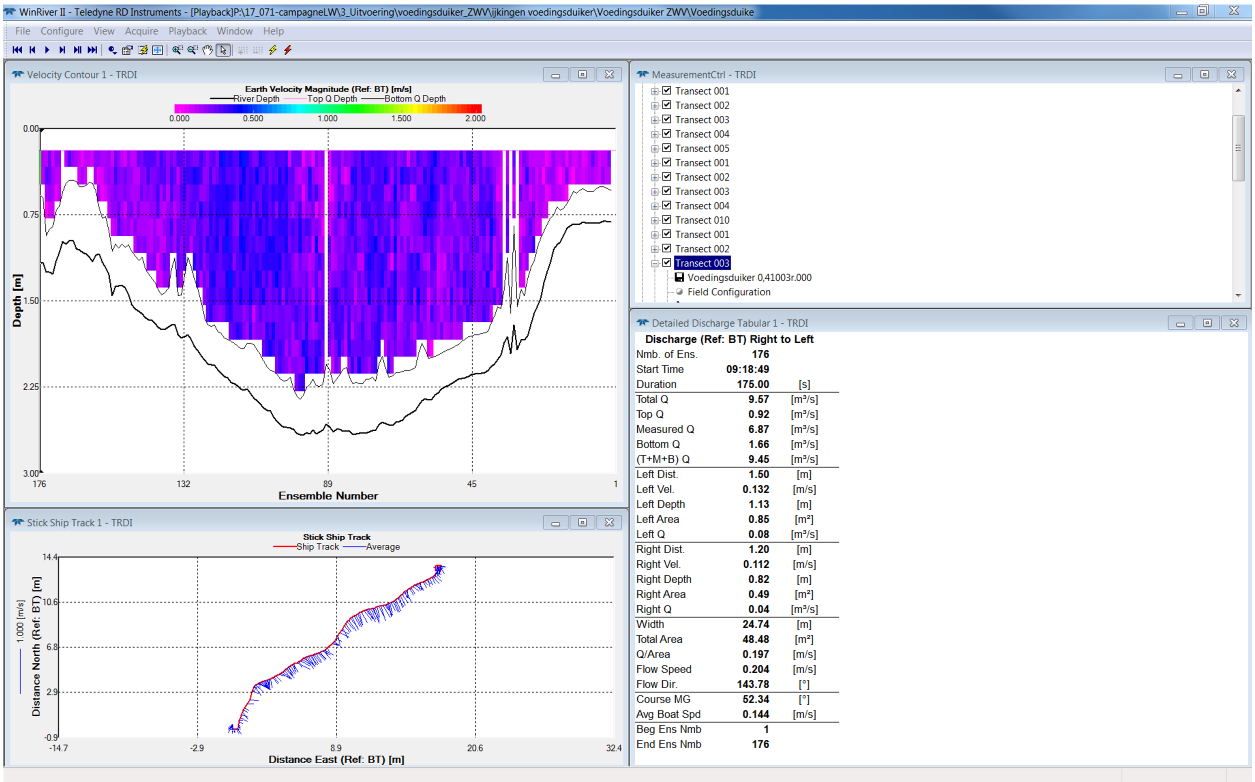
☑ Transect 001
☑ Transect 002
☑ Transect 003
☑ Transect 004
☑ Transect 010
☑ Transect 001
☑ Transect 002
Voedingsduiker 0,41002r.000
Field Configuration

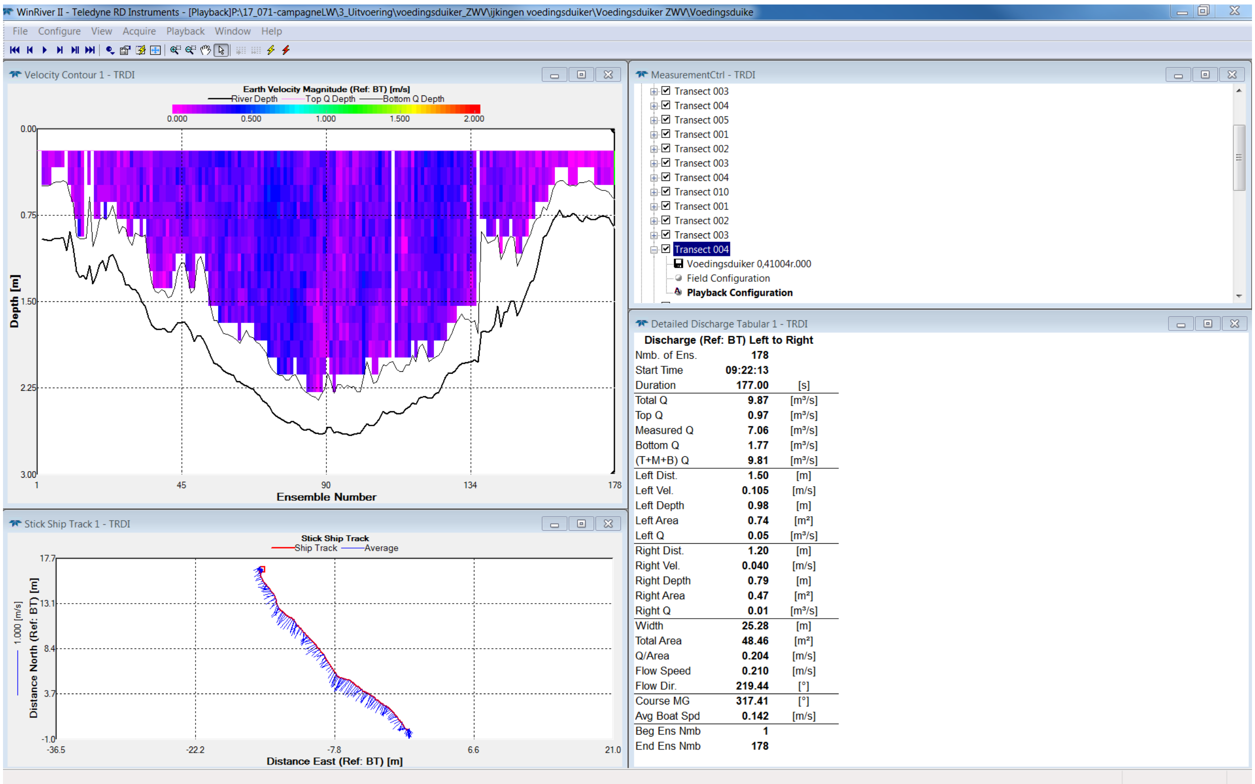
Discharge (Ref: BT) Left to Right

Nmb. of Ens.	180	
Start Time	09:15:19	
Duration	179.00	[s]
Total Q	9.49	[m³/s]
Top Q	0.82	[m³/s]
Measured Q	7.10	[m³/s]
Bottom Q	1.52	[m³/s]
(T+M+B) Q	9.43	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.082	[m/s]
Left Depth	1.19	[m]
Left Area	0.89	[m²]
Left Q	0.05	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.039	[m/s]
Right Depth	0.78	[m]
Right Area	0.47	[m²]
Right Q	0.01	[m³/s]
Width	24.54	[m]
Total Area	47.96	[m²]
Q/Area	0.198	[m/s]
Flow Speed	0.201	[m/s]
Flow Dir.	216.57	[°]
Course MG	317.18	[°]
Avg Boat Spd	0.139	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	180	



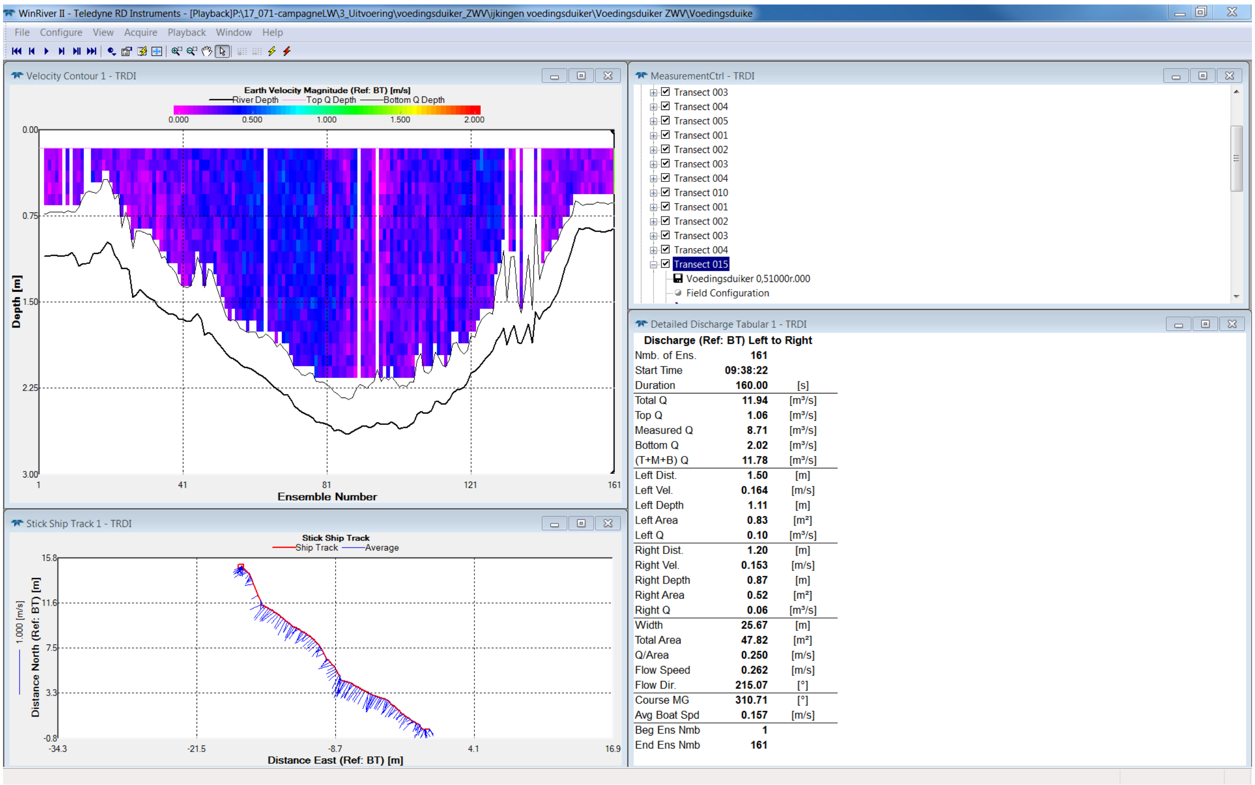
Discharge (Ref: BT) Right to Left

Nmb. of Ens.	176	
Start Time	09:18:49	
Duration	175.00	[s]
Total Q	9.57	[m³/s]
Top Q	0.92	[m³/s]
Measured Q	6.87	[m³/s]
Bottom Q	1.66	[m³/s]
(T+M+B) Q	9.45	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.132	[m/s]
Left Depth	1.13	[m]
Left Area	0.85	[m²]
Left Q	0.08	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.112	[m/s]
Right Depth	0.82	[m]
Right Area	0.49	[m²]
Right Q	0.04	[m³/s]
Width	24.74	[m]
Total Area	48.48	[m²]
Q/Area	0.197	[m/s]
Flow Speed	0.204	[m/s]
Flow Dir.	143.78	[°]
Course MG	52.34	[°]
Avg Boat Spd	0.144	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	176	



Discharge (Ref: BT) Left to Right

Nmb. of Ens.	178	
Start Time	09:22:13	
Duration	177.00	[s]
Total Q	9.87	[m³/s]
Top Q	0.97	[m³/s]
Measured Q	7.06	[m³/s]
Bottom Q	1.77	[m³/s]
(T+M+B) Q	9.81	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.105	[m/s]
Left Depth	0.98	[m]
Left Area	0.74	[m²]
Left Q	0.05	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.040	[m/s]
Right Depth	0.79	[m]
Right Area	0.47	[m²]
Right Q	0.01	[m³/s]
Width	25.28	[m]
Total Area	48.46	[m²]
Q/Area	0.204	[m/s]
Flow Speed	0.210	[m/s]
Flow Dir.	219.44	[°]
Course MG	317.41	[°]
Avg Boat Spd	0.142	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	178	



☑ Transect 003
☑ Transect 004
☑ Transect 005
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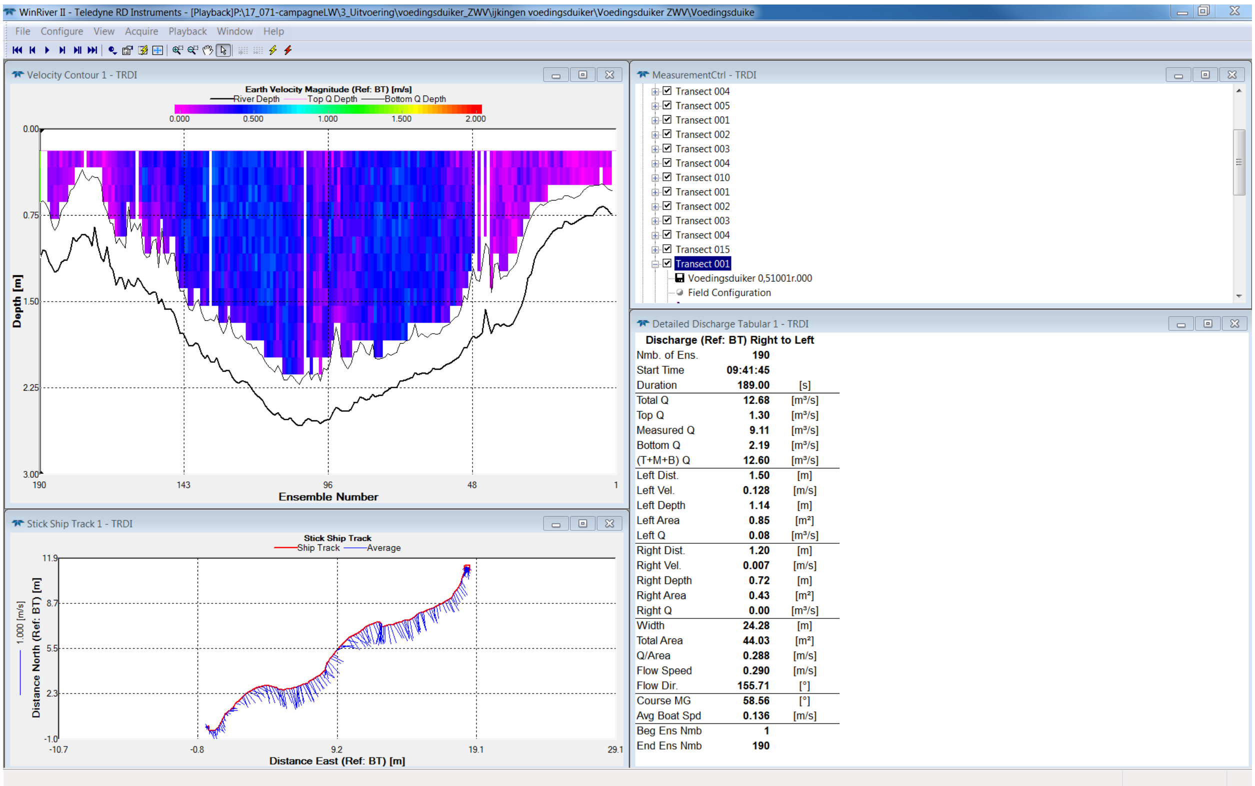
☑ Transect 004
☑ Transect 010
☑ Transect 001
☑ Transect 002
☑ Transect 003
☑ Transect 004
☑ Transect 015
Voedingsduiker 0,51000r.000
Field Configuration

Discharge (Ref: BT) Left to Right

Nmb. of Ens.	161	
Start Time	09:38:22	
Duration	160.00	[s]
Total Q	11.94	[m³/s]
Top Q	1.06	[m³/s]
Measured Q	8.71	[m³/s]
Bottom Q	2.02	[m³/s]
(T+M+B) Q	11.78	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.164	[m/s]
Left Depth	1.11	[m]
Left Area	0.83	[m²]
Left Q	0.10	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.153	[m/s]
Right Depth	0.87	[m]
Right Area	0.52	[m²]
Right Q	0.06	[m³/s]
Width	25.67	[m]
Total Area	47.82	[m²]
Q/Area	0.250	[m/s]
Flow Speed	0.262	[m/s]
Flow Dir.	215.07	[°]
Course MG	310.71	[°]
Avg Boat Spd	0.157	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	161	



☑ Transect 004
☑ Transect 005
☑ Transect 001
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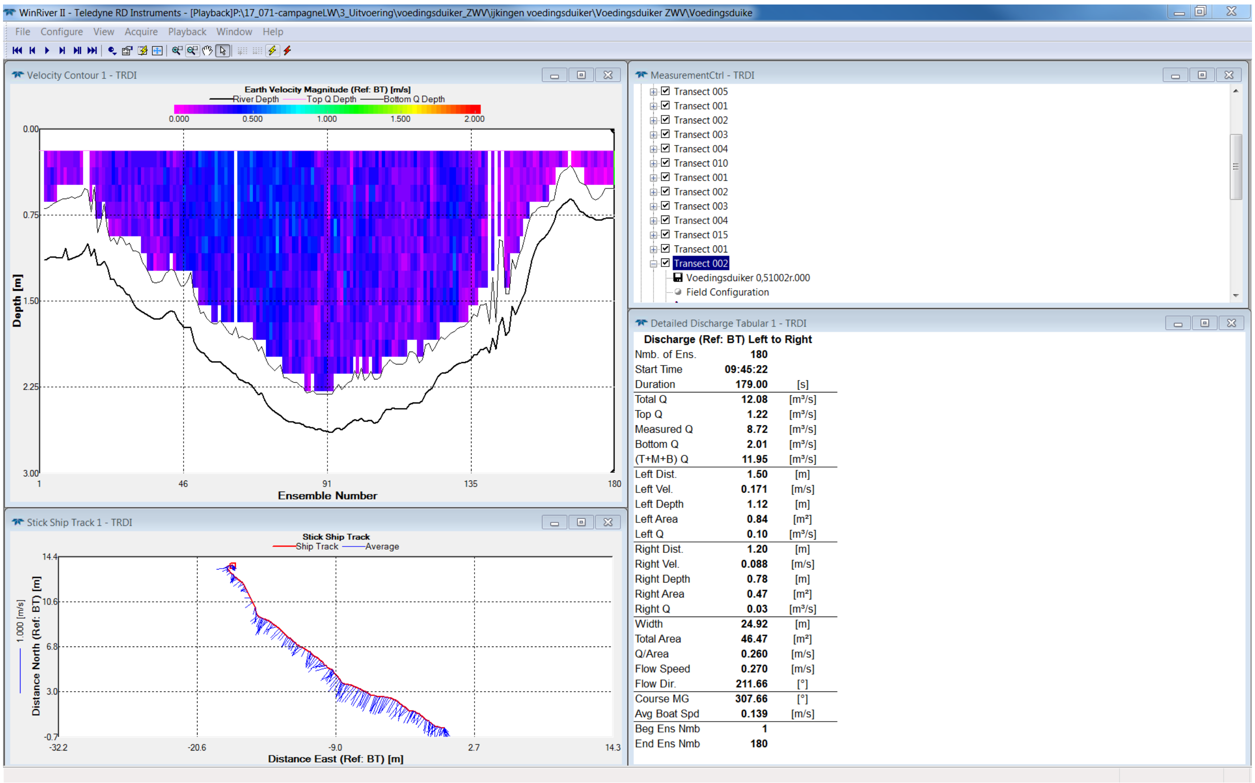
☑ Transect 003
☑ Transect 004
☑ Transect 010
☑ Transect 001
☑ Transect 002
☑ Transect 003
☑ Transect 004
☑ Transect 015
☑ Transect 001
Voedingsduiker 0,51001r.000
Field Configuration

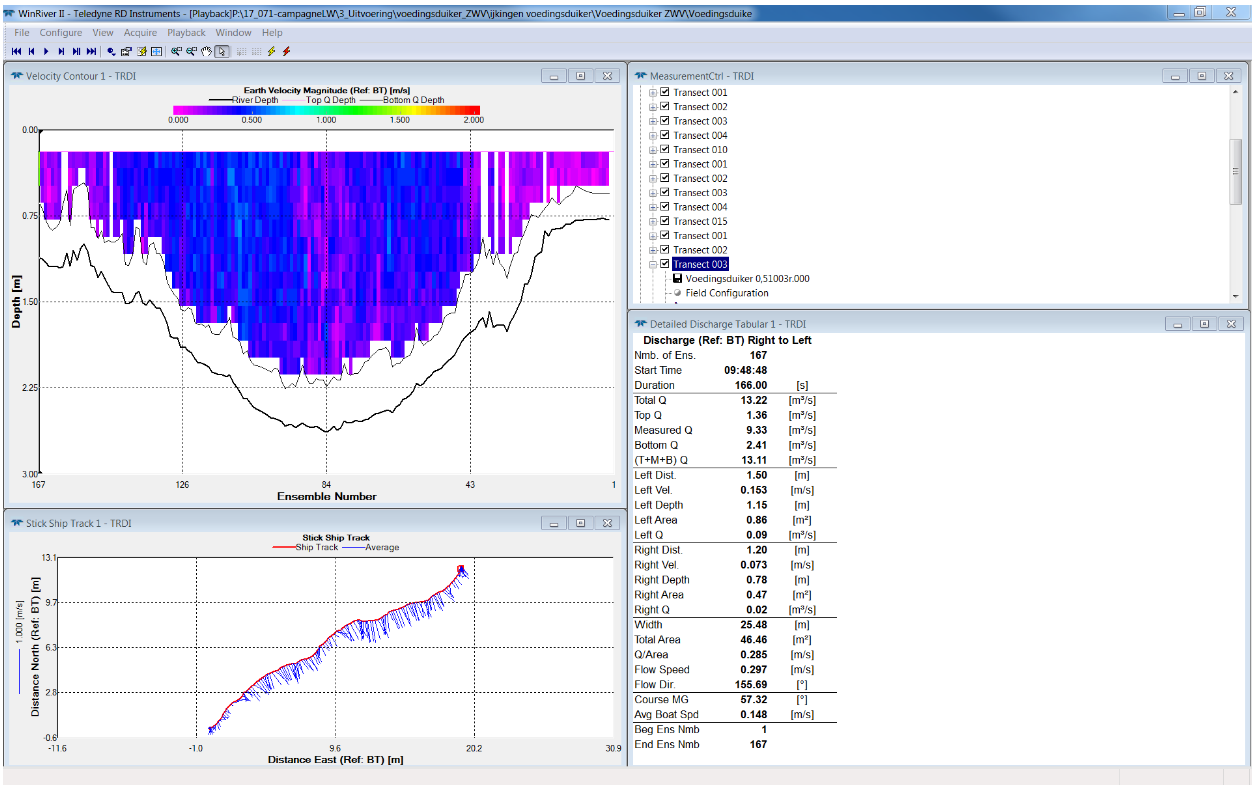
Discharge (Ref: BT) Right to Left

Nmb. of Ens.	190	
Start Time	09:41:45	
Duration	189.00	[s]
Total Q	12.68	[m³/s]
Top Q	1.30	[m³/s]
Measured Q	9.11	[m³/s]
Bottom Q	2.19	[m³/s]
(T+M+B) Q	12.60	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.128	[m/s]
Left Depth	1.14	[m]
Left Area	0.85	[m²]
Left Q	0.08	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.007	[m/s]
Right Depth	0.72	[m]
Right Area	0.43	[m²]
Right Q	0.00	[m³/s]
Width	24.28	[m]
Total Area	44.03	[m²]
Q/Area	0.288	[m/s]
Flow Speed	0.290	[m/s]
Flow Dir.	155.71	[°]
Course MG	58.56	[°]
Avg Boat Spd	0.136	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	190	



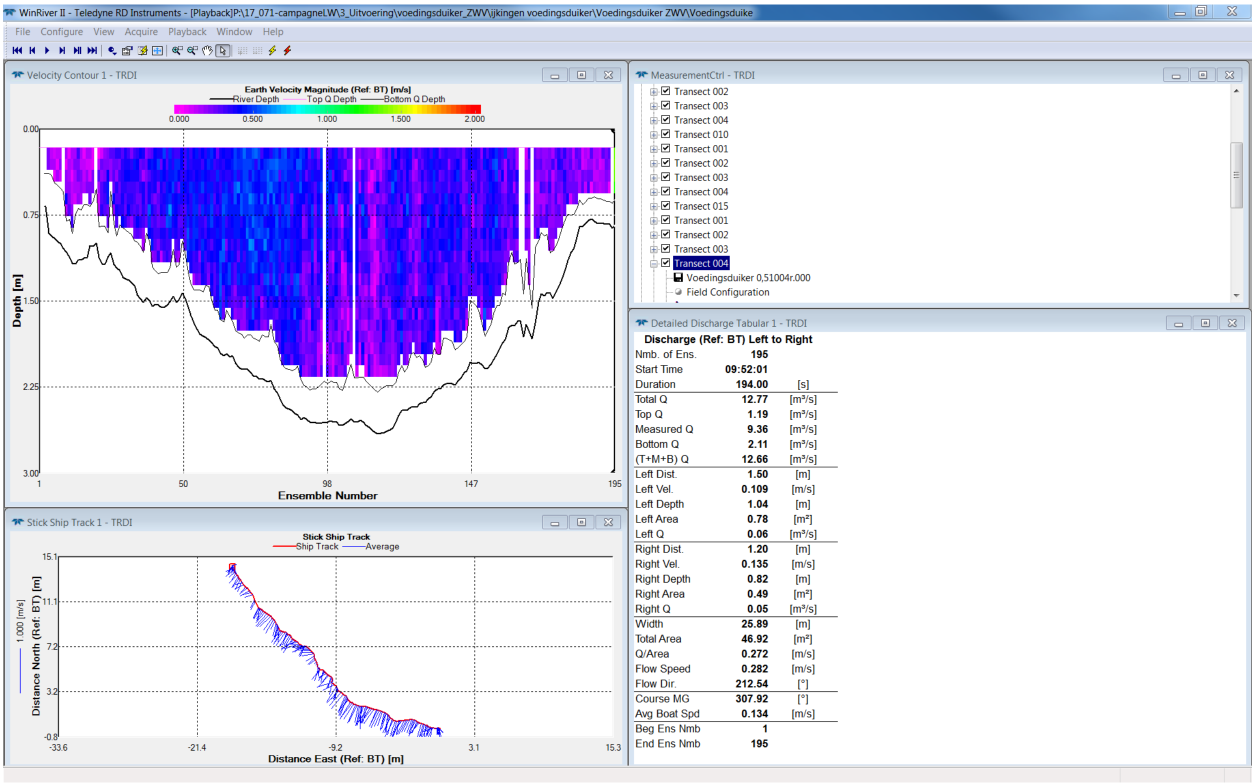
Discharge (Ref: BT) Left to Right

Nmb. of Ens.	180	
Start Time	09:45:22	
Duration	179.00	[s]
Total Q	12.08	[m³/s]
Top Q	1.22	[m³/s]
Measured Q	8.72	[m³/s]
Bottom Q	2.01	[m³/s]
(T+M+B) Q	11.95	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.171	[m/s]
Left Depth	1.12	[m]
Left Area	0.84	[m²]
Left Q	0.10	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.088	[m/s]
Right Depth	0.78	[m]
Right Area	0.47	[m²]
Right Q	0.03	[m³/s]
Width	24.92	[m]
Total Area	46.47	[m²]
Q/Area	0.260	[m/s]
Flow Speed	0.270	[m/s]
Flow Dir.	211.66	[°]
Course MG	307.66	[°]
Avg Boat Spd	0.139	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	180	



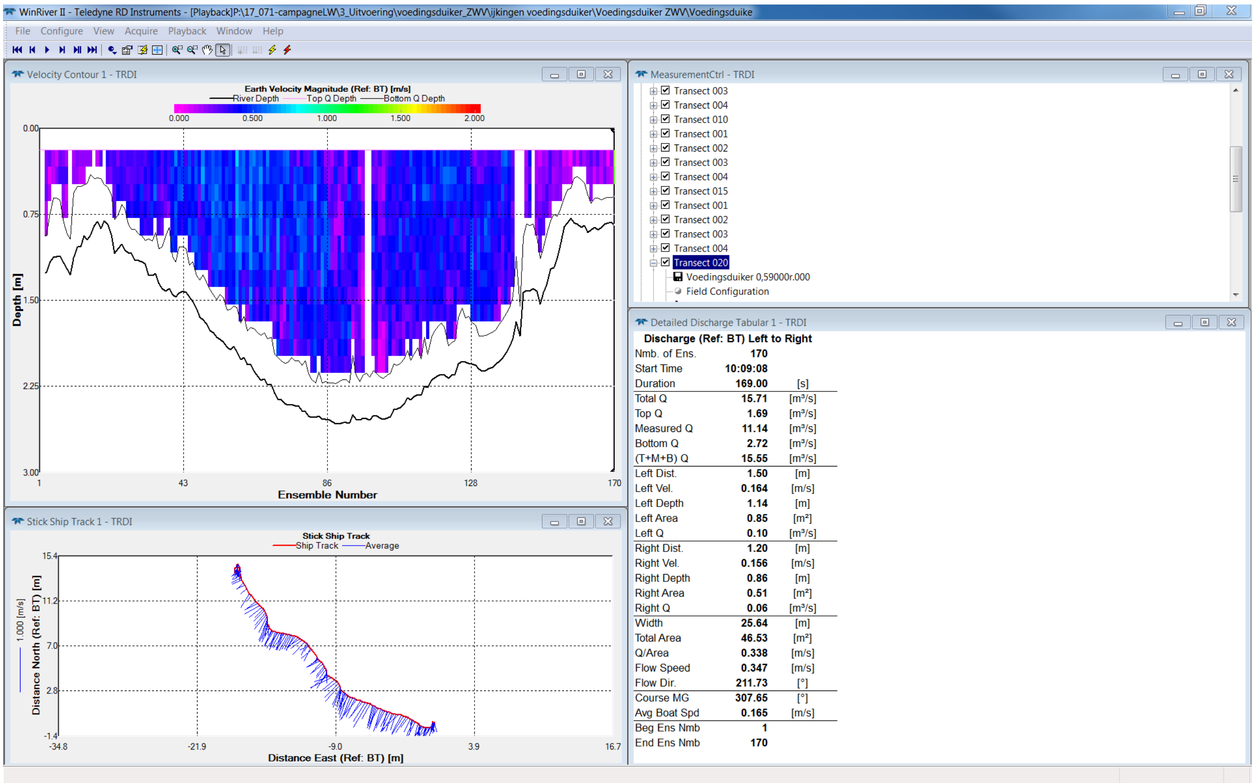
Discharge (Ref: BT) Right to Left

Nmb. of Ens.	167	
Start Time	09:48:48	
Duration	166.00	[s]
Total Q	13.22	[m³/s]
Top Q	1.36	[m³/s]
Measured Q	9.33	[m³/s]
Bottom Q	2.41	[m³/s]
(T+M+B) Q	13.11	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.153	[m/s]
Left Depth	1.15	[m]
Left Area	0.86	[m²]
Left Q	0.09	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.073	[m/s]
Right Depth	0.78	[m]
Right Area	0.47	[m²]
Right Q	0.02	[m³/s]
Width	25.48	[m]
Total Area	46.46	[m²]
Q/Area	0.285	[m/s]
Flow Speed	0.297	[m/s]
Flow Dir.	155.69	[°]
Course MG	57.32	[°]
Avg Boat Spd	0.148	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	167	



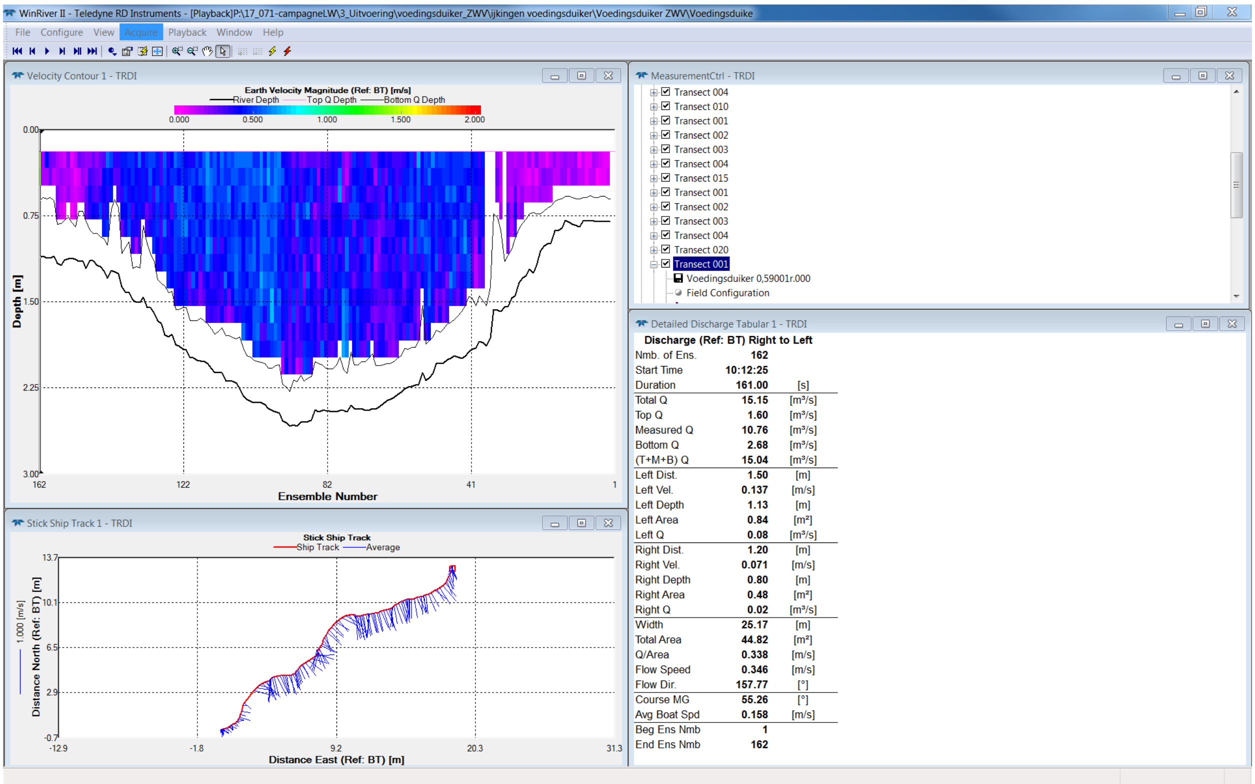
Discharge (Ref: BT) Left to Right

Nmb. of Ens.	195	
Start Time	09:52:01	
Duration	194.00	[s]
Total Q	12.77	[m³/s]
Top Q	1.19	[m³/s]
Measured Q	9.36	[m³/s]
Bottom Q	2.11	[m³/s]
(T+M+B) Q	12.66	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.109	[m/s]
Left Depth	1.04	[m]
Left Area	0.78	[m²]
Left Q	0.06	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.135	[m/s]
Right Depth	0.82	[m]
Right Area	0.49	[m²]
Right Q	0.05	[m³/s]
Width	25.89	[m]
Total Area	46.92	[m²]
Q/Area	0.272	[m/s]
Flow Speed	0.282	[m/s]
Flow Dir.	212.54	[°]
Course MG	307.92	[°]
Avg Boat Spd	0.134	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	195	



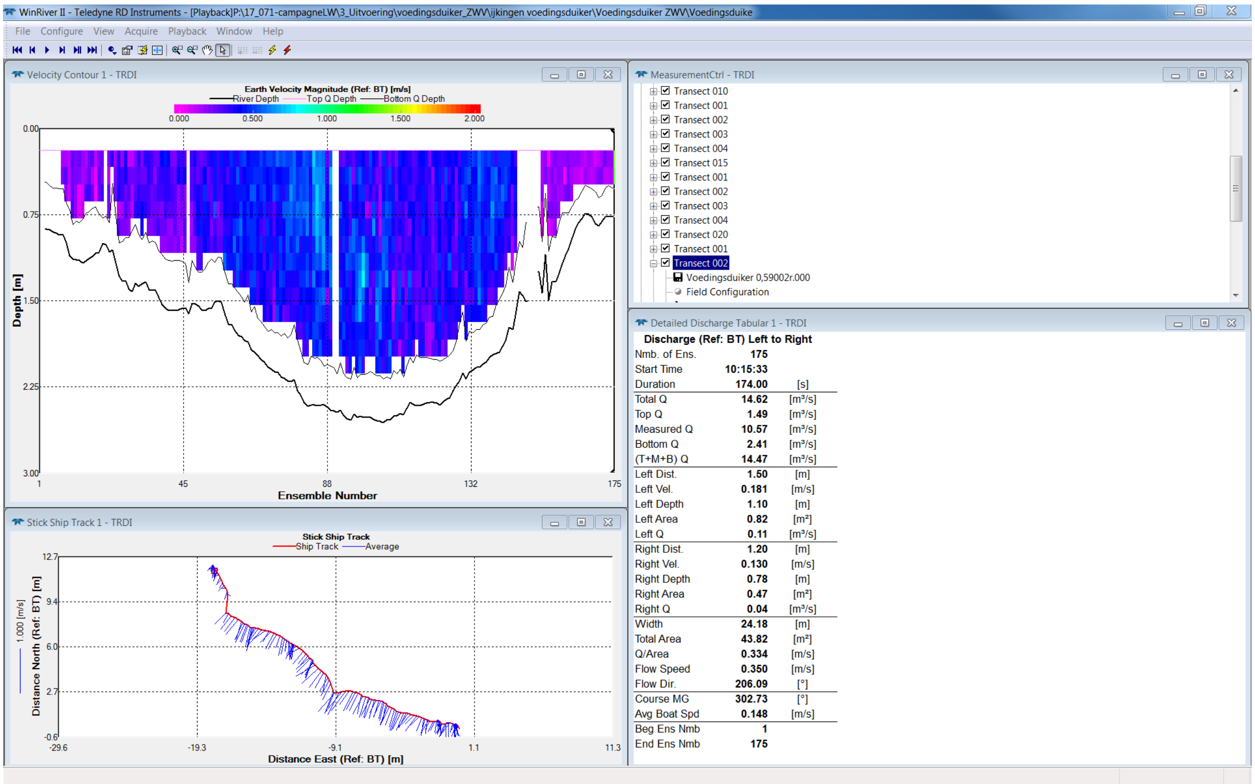
Discharge (Ref: BT) Left to Right

Nmb. of Ens.	170	
Start Time	10:09:08	
Duration	169.00	[s]
Total Q	15.71	[m³/s]
Top Q	1.69	[m³/s]
Measured Q	11.14	[m³/s]
Bottom Q	2.72	[m³/s]
(T+M+B) Q	15.55	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.164	[m/s]
Left Depth	1.14	[m]
Left Area	0.85	[m²]
Left Q	0.10	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.156	[m/s]
Right Depth	0.86	[m]
Right Area	0.51	[m²]
Right Q	0.06	[m³/s]
Width	25.64	[m]
Total Area	46.53	[m²]
Q/Area	0.338	[m/s]
Flow Speed	0.347	[m/s]
Flow Dir.	211.73	[°]
Course MG	307.65	[°]
Avg Boat Spd	0.165	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	170	



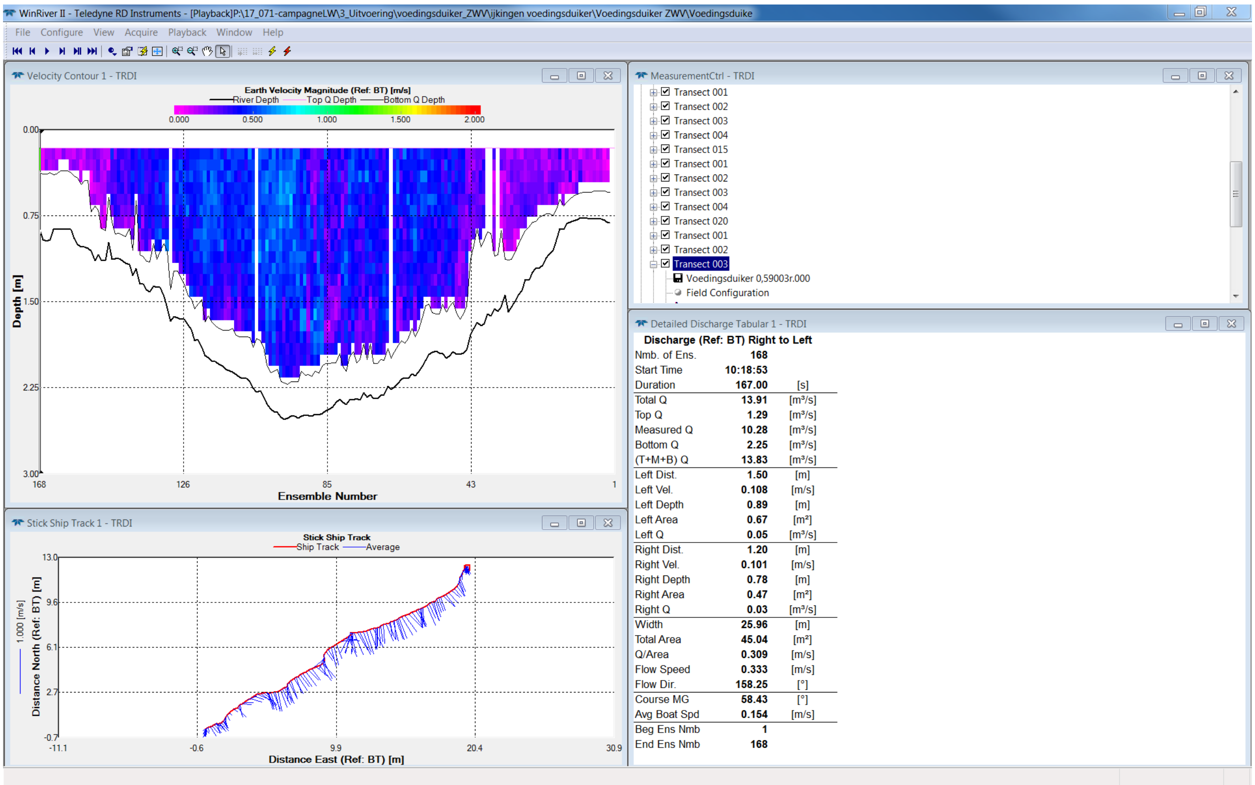
Discharge (Ref: BT) Right to Left

Nmb. of Ens.	162	
Start Time	10:12:25	
Duration	161.00	[s]
Total Q	15.15	[m³/s]
Top Q	1.60	[m³/s]
Measured Q	10.76	[m³/s]
Bottom Q	2.68	[m³/s]
(T+M+B) Q	15.04	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.137	[m/s]
Left Depth	1.13	[m]
Left Area	0.84	[m²]
Left Q	0.08	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.071	[m/s]
Right Depth	0.80	[m]
Right Area	0.48	[m²]
Right Q	0.02	[m³/s]
Width	25.17	[m]
Total Area	44.82	[m²]
Q/Area	0.338	[m/s]
Flow Speed	0.346	[m/s]
Flow Dir.	157.77	[°]
Course MG	55.26	[°]
Avg Boat Spd	0.158	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	162	



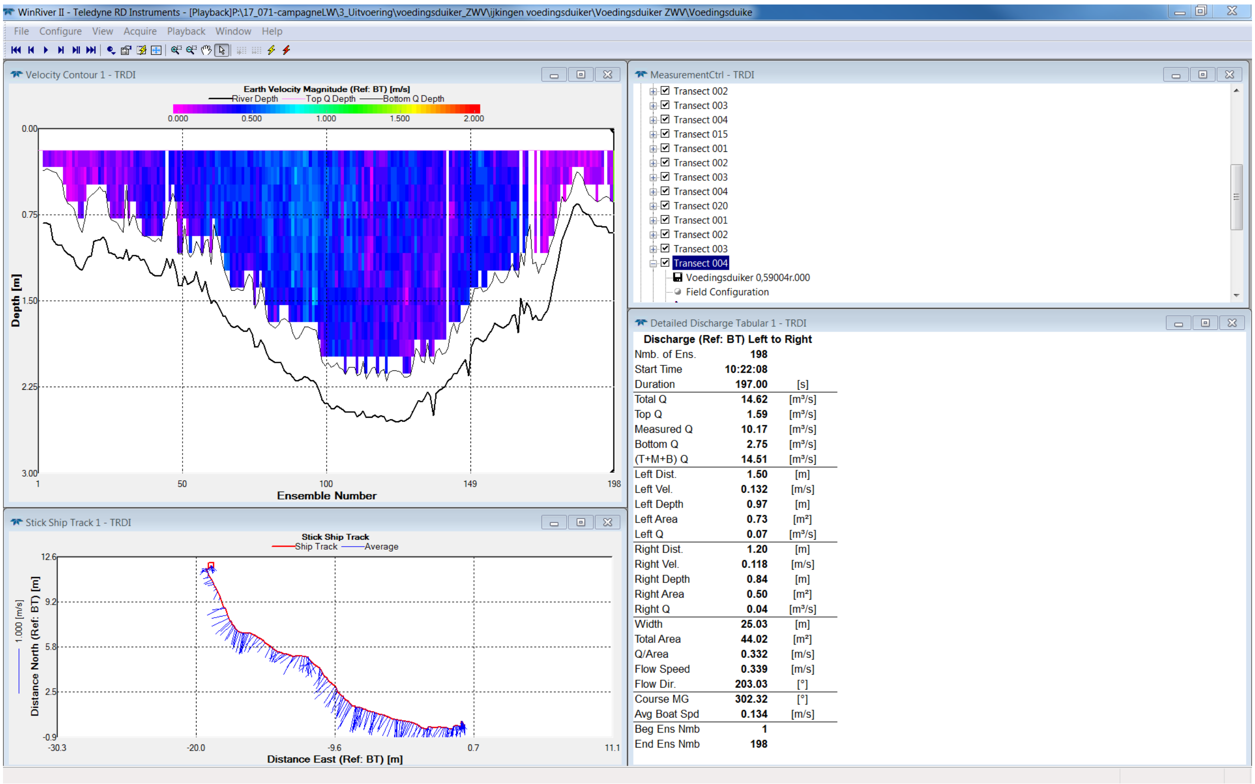
Discharge (Ref: BT) Left to Right

Nmb. of Ens.	175	
Start Time	10:15:33	
Duration	174.00	[s]
Total Q	14.62	[m³/s]
Top Q	1.49	[m³/s]
Measured Q	10.57	[m³/s]
Bottom Q	2.41	[m³/s]
(T+M+B) Q	14.47	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.181	[m/s]
Left Depth	1.10	[m]
Left Area	0.82	[m²]
Left Q	0.11	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.130	[m/s]
Right Depth	0.78	[m]
Right Area	0.47	[m²]
Right Q	0.04	[m³/s]
Width	24.18	[m]
Total Area	43.82	[m²]
Q/Area	0.334	[m/s]
Flow Speed	0.350	[m/s]
Flow Dir.	206.09	[°]
Course MG	302.73	[°]
Avg Boat Spd	0.148	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	175	



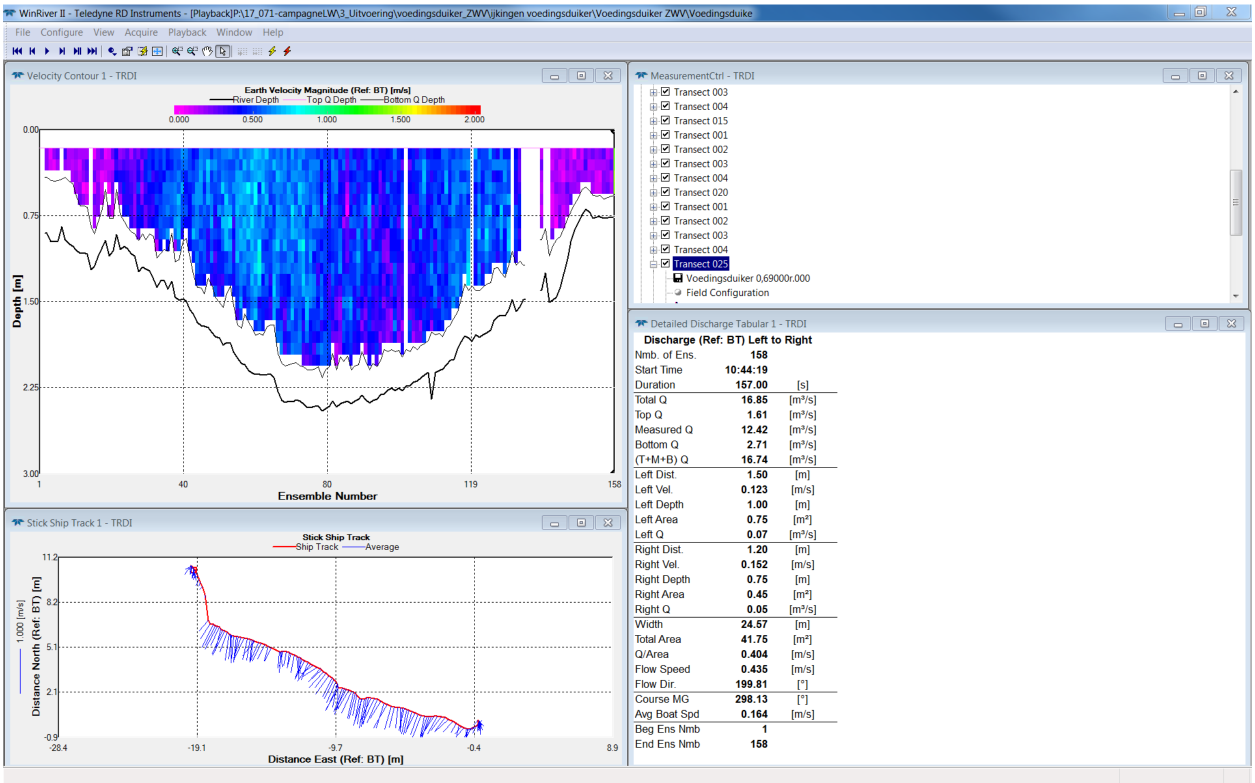
Discharge (Ref: BT) Right to Left

Nmb. of Ens.	168	
Start Time	10:18:53	
Duration	167.00	[s]
Total Q	13.91	[m³/s]
Top Q	1.29	[m³/s]
Measured Q	10.28	[m³/s]
Bottom Q	2.25	[m³/s]
(T+M+B) Q	13.83	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.108	[m/s]
Left Depth	0.89	[m]
Left Area	0.67	[m²]
Left Q	0.05	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.101	[m/s]
Right Depth	0.78	[m]
Right Area	0.47	[m²]
Right Q	0.03	[m³/s]
Width	25.96	[m]
Total Area	45.04	[m²]
Q/Area	0.309	[m/s]
Flow Speed	0.333	[m/s]
Flow Dir.	158.25	[°]
Course MG	58.43	[°]
Avg Boat Spd	0.154	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	168	



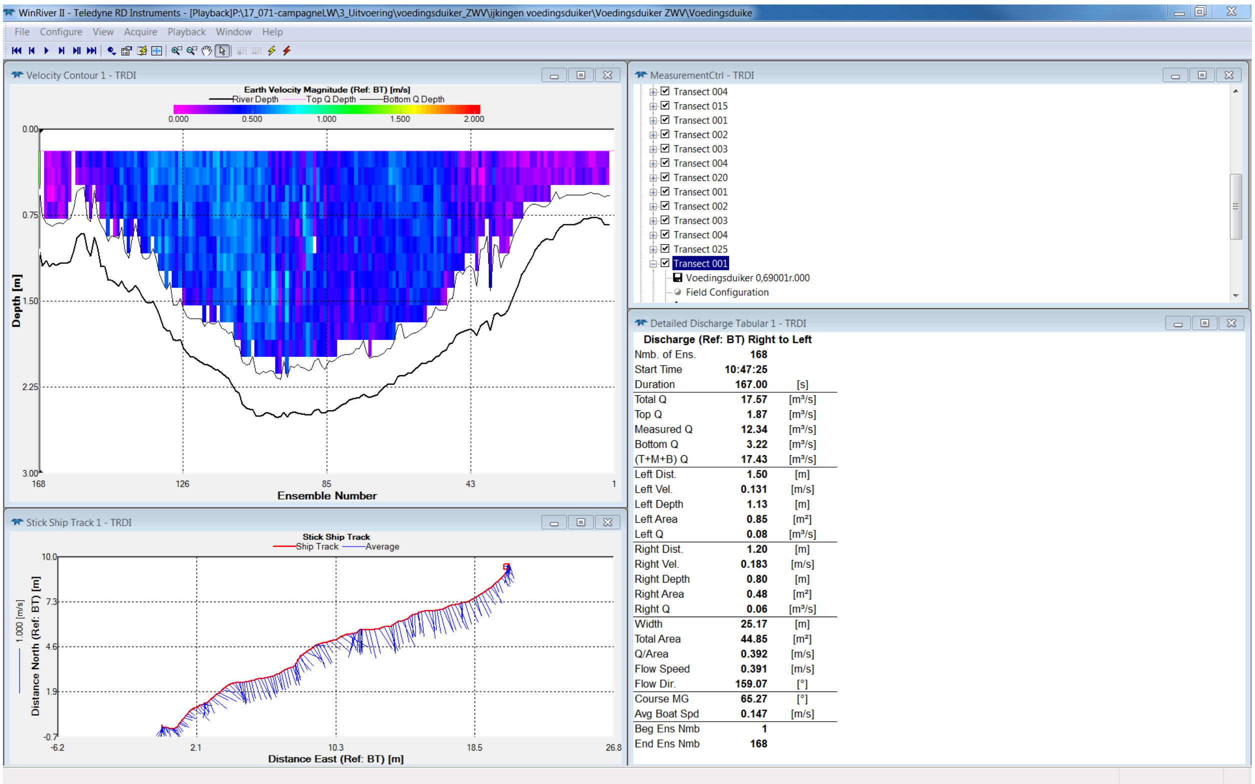
Discharge (Ref: BT) Left to Right

Nmb. of Ens.	198	
Start Time	10:22:08	
Duration	197.00	[s]
Total Q	14.62	[m³/s]
Top Q	1.59	[m³/s]
Measured Q	10.17	[m³/s]
Bottom Q	2.75	[m³/s]
(T+M+B) Q	14.51	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.132	[m/s]
Left Depth	0.97	[m]
Left Area	0.73	[m²]
Left Q	0.07	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.118	[m/s]
Right Depth	0.84	[m]
Right Area	0.50	[m²]
Right Q	0.04	[m³/s]
Width	25.03	[m]
Total Area	44.02	[m²]
Q/Area	0.332	[m/s]
Flow Speed	0.339	[m/s]
Flow Dir.	203.03	[°]
Course MG	302.32	[°]
Avg Boat Spd	0.134	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	198	



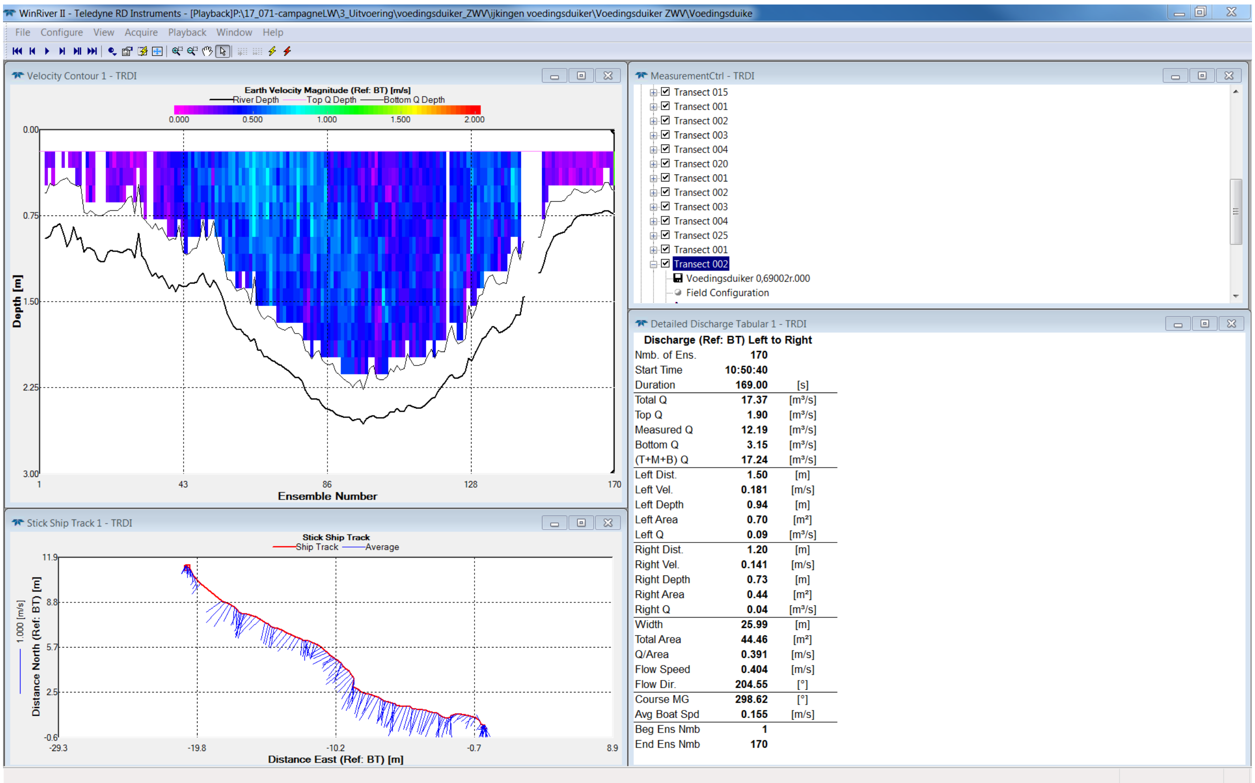
Discharge (Ref: BT) Left to Right

Nmb. of Ens.	158	
Start Time	10:44:19	
Duration	157.00	[s]
Total Q	16.85	[m³/s]
Top Q	1.61	[m³/s]
Measured Q	12.42	[m³/s]
Bottom Q	2.71	[m³/s]
(T+M+B) Q	16.74	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.123	[m/s]
Left Depth	1.00	[m]
Left Area	0.75	[m²]
Left Q	0.07	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.152	[m/s]
Right Depth	0.75	[m]
Right Area	0.45	[m²]
Right Q	0.05	[m³/s]
Width	24.57	[m]
Total Area	41.75	[m²]
Q/Area	0.404	[m/s]
Flow Speed	0.435	[m/s]
Flow Dir.	199.81	[°]
Course MG	298.13	[°]
Avg Boat Spd	0.164	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	158	



Discharge (Ref: BT) Right to Left

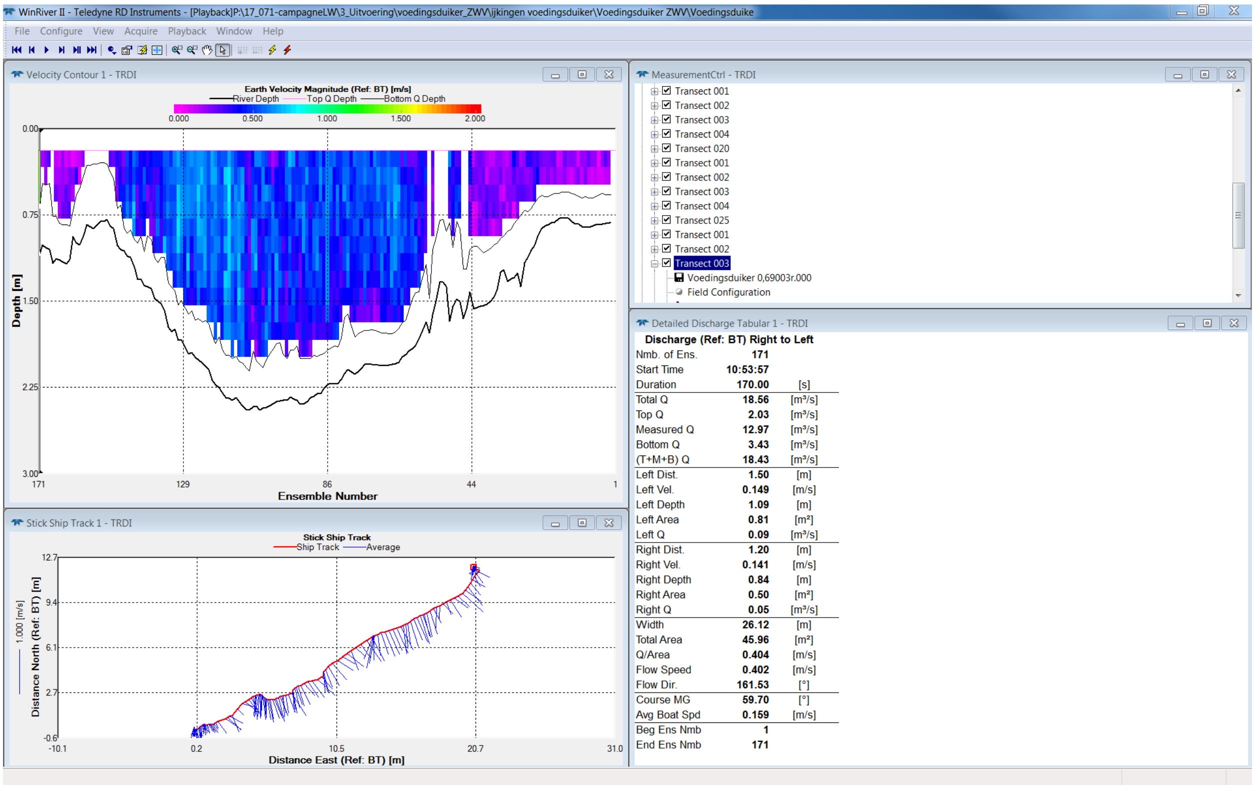
Nmb. of Ens.	168	
Start Time	10:47:25	
Duration	167.00	[s]
Total Q	17.57	[m³/s]
Top Q	1.87	[m³/s]
Measured Q	12.34	[m³/s]
Bottom Q	3.22	[m³/s]
(T+M+B) Q	17.43	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.131	[m/s]
Left Depth	1.13	[m]
Left Area	0.85	[m²]
Left Q	0.08	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.183	[m/s]
Right Depth	0.80	[m]
Right Area	0.48	[m²]
Right Q	0.06	[m³/s]
Width	25.17	[m]
Total Area	44.85	[m²]
Q/Area	0.392	[m/s]
Flow Speed	0.391	[m/s]
Flow Dir.	159.07	[°]
Course MG	65.27	[°]
Avg Boat Spd	0.147	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	168	



☑ Transect 015
☑ Transect 001
☑ Transect 002
☑ Transect 003
☑ Transect 004
☑ Transect 020
☑ Transect 001
☑ Transect 002
☑ Transect 003
☑ Transect 004
☑ Transect 025
☑ Transect 001
☑ Transect 002
Voedingsduiker 0,69002r.000
Field Configuration

Discharge (Ref: BT) Left to Right

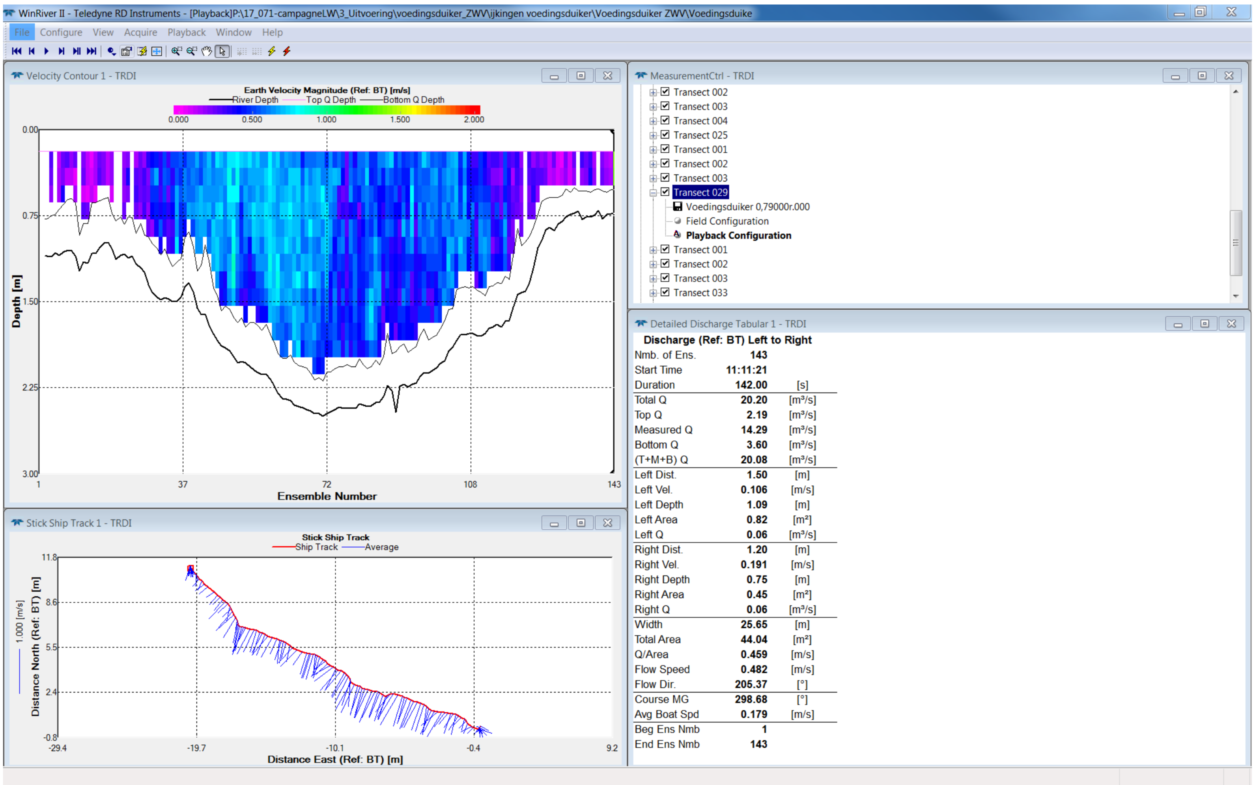
Nmb. of Ens.	170	
Start Time	10:50:40	
Duration	169.00	[s]
Total Q	17.37	[m³/s]
Top Q	1.90	[m³/s]
Measured Q	12.19	[m³/s]
Bottom Q	3.15	[m³/s]
(T+M+B) Q	17.24	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.181	[m/s]
Left Depth	0.94	[m]
Left Area	0.70	[m²]
Left Q	0.09	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.141	[m/s]
Right Depth	0.73	[m]
Right Area	0.44	[m²]
Right Q	0.04	[m³/s]
Width	25.99	[m]
Total Area	44.46	[m²]
Q/Area	0.391	[m/s]
Flow Speed	0.404	[m/s]
Flow Dir.	204.55	[°]
Course MG	298.62	[°]
Avg Boat Spd	0.155	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	170	



☑ Transect 001
☑ Transect 002
☑ Transect 003
☑ Transect 004
☑ Transect 020
☑ Transect 001
☑ Transect 002
☑ Transect 003
☑ Transect 004
☑ Transect 025
☑ Transect 001
☑ Transect 002
☑ Transect 003
Voedingsduiker 0,69003r.000
Field Configuration

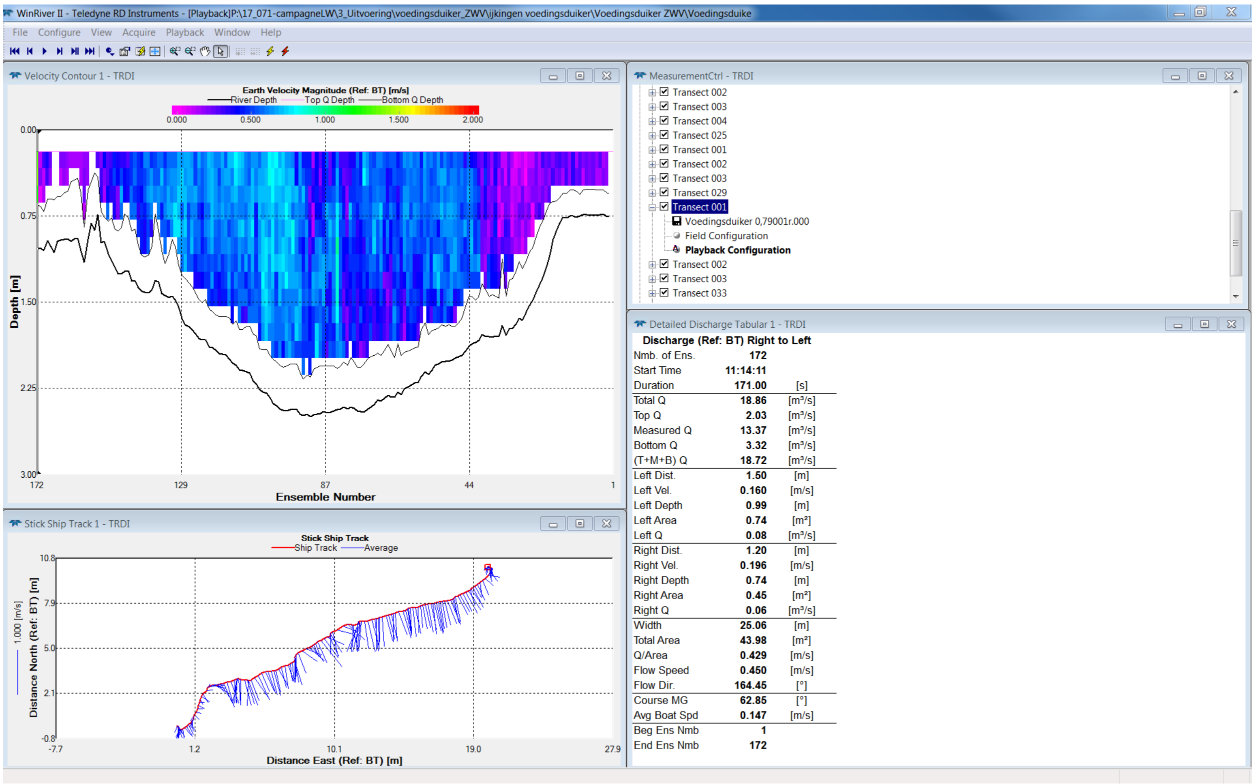
Discharge (Ref: BT) Right to Left

Nmb. of Ens.	171	
Start Time	10:53:57	
Duration	170.00	[s]
Total Q	18.56	[m³/s]
Top Q	2.03	[m³/s]
Measured Q	12.97	[m³/s]
Bottom Q	3.43	[m³/s]
(T+M+B) Q	18.43	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.149	[m/s]
Left Depth	1.09	[m]
Left Area	0.81	[m²]
Left Q	0.09	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.141	[m/s]
Right Depth	0.84	[m]
Right Area	0.50	[m²]
Right Q	0.05	[m³/s]
Width	26.12	[m]
Total Area	45.96	[m²]
Q/Area	0.404	[m/s]
Flow Speed	0.402	[m/s]
Flow Dir.	161.53	[°]
Course MG	59.70	[°]
Avg Boat Spd	0.159	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	171	



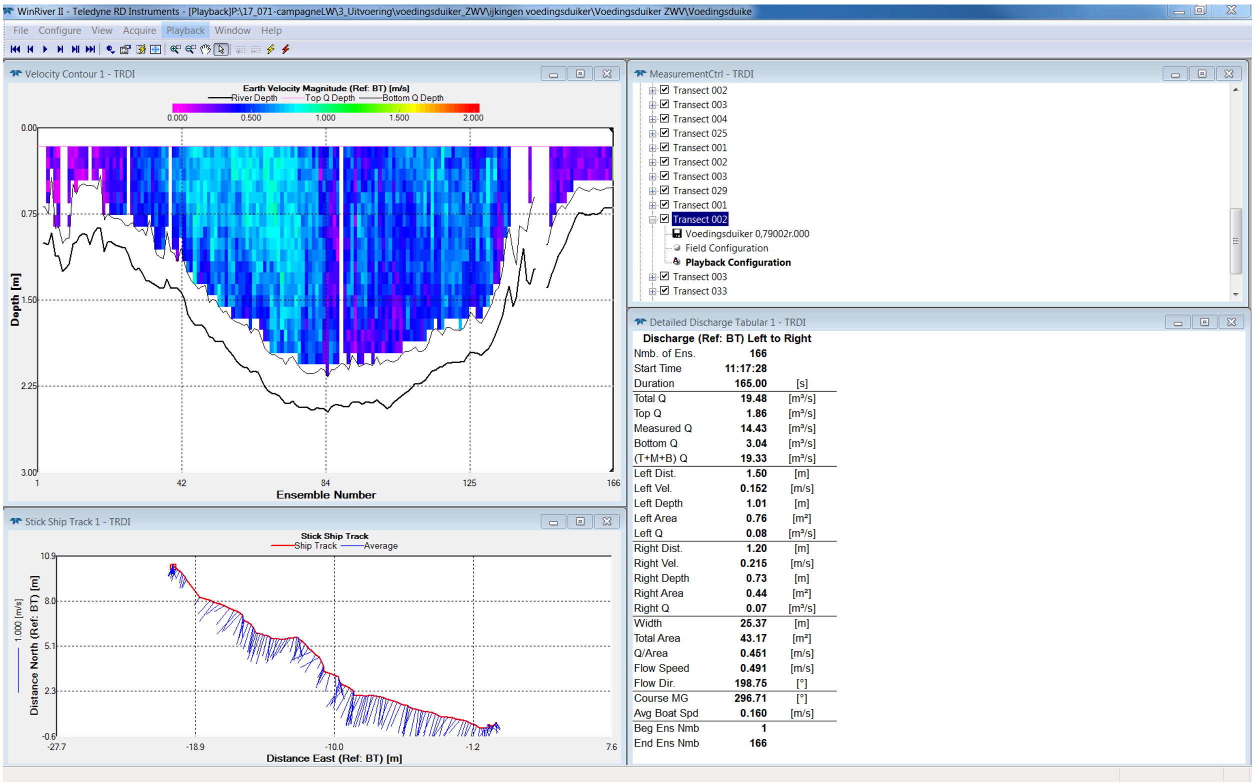
Discharge (Ref: BT) Left to Right

Nmb. of Ens.	143	
Start Time	11:11:21	
Duration	142.00	[s]
Total Q	20.20	[m³/s]
Top Q	2.19	[m³/s]
Measured Q	14.29	[m³/s]
Bottom Q	3.60	[m³/s]
(T+M+B) Q	20.08	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.106	[m/s]
Left Depth	1.09	[m]
Left Area	0.82	[m²]
Left Q	0.06	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.191	[m/s]
Right Depth	0.75	[m]
Right Area	0.45	[m²]
Right Q	0.06	[m³/s]
Width	25.65	[m]
Total Area	44.04	[m²]
Q/Area	0.459	[m/s]
Flow Speed	0.482	[m/s]
Flow Dir.	205.37	[°]
Course MG	298.68	[°]
Avg Boat Spd	0.179	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	143	



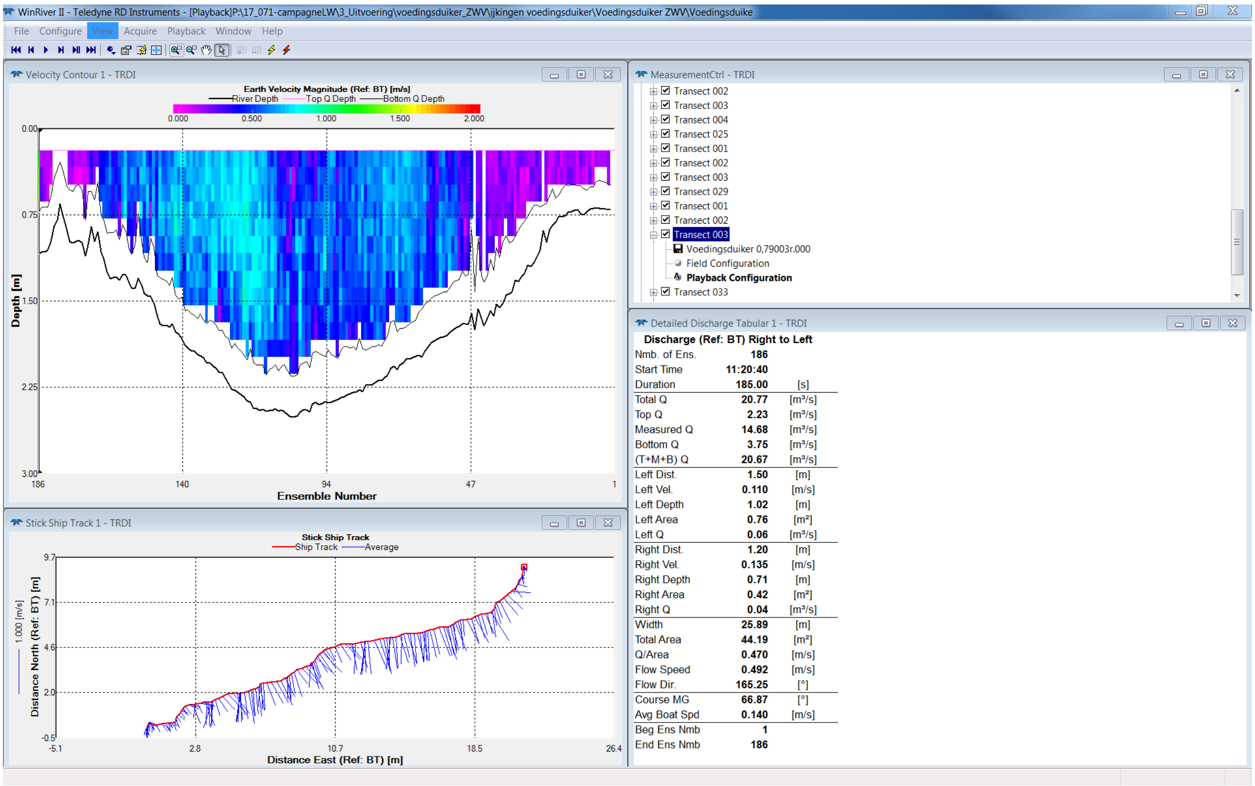
Discharge (Ref: BT) Right to Left

Nmb. of Ens.	172	
Start Time	11:14:11	
Duration	171.00	[s]
Total Q	18.86	[m³/s]
Top Q	2.03	[m³/s]
Measured Q	13.37	[m³/s]
Bottom Q	3.32	[m³/s]
(T+M+B) Q	18.72	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.160	[m/s]
Left Depth	0.99	[m]
Left Area	0.74	[m²]
Left Q	0.08	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.196	[m/s]
Right Depth	0.74	[m]
Right Area	0.45	[m²]
Right Q	0.06	[m³/s]
Width	25.06	[m]
Total Area	43.98	[m²]
Q/Area	0.429	[m/s]
Flow Speed	0.450	[m/s]
Flow Dir.	164.45	[°]
Course MG	62.85	[°]
Avg Boat Spd	0.147	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	172	



Discharge (Ref: BT) Left to Right

Nmb. of Ens.	166	
Start Time	11:17:28	
Duration	165.00	[s]
Total Q	19.48	[m³/s]
Top Q	1.86	[m³/s]
Measured Q	14.43	[m³/s]
Bottom Q	3.04	[m³/s]
(T+M+B) Q	19.33	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.152	[m/s]
Left Depth	1.01	[m]
Left Area	0.76	[m²]
Left Q	0.08	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.215	[m/s]
Right Depth	0.73	[m]
Right Area	0.44	[m²]
Right Q	0.07	[m³/s]
Width	25.37	[m]
Total Area	43.17	[m²]
Q/Area	0.451	[m/s]
Flow Speed	0.491	[m/s]
Flow Dir.	198.75	[°]
Course MG	296.71	[°]
Avg Boat Spd	0.160	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	166	



Discharge (Ref: BT) Right to Left

Nmb. of Ens.	186	
Start Time	11:20:40	
Duration	185.00	[s]
Total Q	20.77	[m³/s]
Top Q	2.23	[m³/s]
Measured Q	14.68	[m³/s]
Bottom Q	3.75	[m³/s]
(T+M+B) Q	20.67	[m³/s]
Left Dist.	1.50	[m]
Left Vel.	0.110	[m/s]
Left Depth	1.02	[m]
Left Area	0.76	[m²]
Left Q	0.06	[m³/s]
Right Dist.	1.20	[m]
Right Vel.	0.135	[m/s]
Right Depth	0.71	[m]
Right Area	0.42	[m²]
Right Q	0.04	[m³/s]
Width	25.89	[m]
Total Area	44.19	[m²]
Q/Area	0.470	[m/s]
Flow Speed	0.492	[m/s]
Flow Dir.	165.25	[°]
Course MG	66.87	[°]
Avg Boat Spd	0.140	[m/s]
Beg Ens Nmb	1	
End Ens Nmb	186	

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