Mobile ADCP-Systems

Velocity and discharge measurement in waterbodies

Short Description

- Measurement of flow velocity
- Fast and accurate discharge determination
- High range of application
- Simple handling

Rio Grande
with Riverboat

StreamPro

RiverRay

Workhorse Rio Grande
on boat

Measurement with Workhorse Rio
Grande and Riverboat

Measurement on rubber boat

Preparation of
StreamPro

StreamPro

We are certified
ISO 9001:2008
Certificate No. 01150509
Quality is our standard

RiverRay

Automatic measuring system for velocity and discharge in rivers

The RiverRay ADCP (Acoustic Doppler Current Profiler) is a state-of-the-art, comfortable discharge measurement device installed in a floating body. The flat-surface, phased array transducer integrates the latest measuring technology and provides an innovative result of the discharge measurement.

RiverRay highlights

- Easy operation thanks to automatic adjustment of cells and measuring modes
- Flat-surface, phased array transducer
- Reduced size and weight ADCP sensor with low flow disturbance
- New improved floating body
- Wireless data transmission via Bluetooth
- Expandable with (D)GPS
- Large measuring range allows measurements in high and low water levels with one system
- Windows-based data collection software for presentation of all measuring results

Technical Data

ADCP Sensor

Number of cells:	automatic, 25 typical, 200 maximum
Cell size:	automatic, 10 - 80cm
Min. depth:	0.4m
Max. depth:	40m
Bottom Tracking:	70m
Accuracy:	±0.2cm/s or ±0.3% of velocity (water and boat)
Resolution:	0.1cm/s
Measurement range:	±5m/s
Configuration:	phase controlled sensor
Frequency:	600kHz
Geometry:	4 beams
Beamangle:	30°

Integrated sensors

Temperature	
Measurement range:	-5°C to 45°C
Accuracy:	±0.4°C
Resolution:	0.01°C
Tilt	
Measurement range:	±15°
Accuracy:	±0.5°
Resolution:	0.01°
Compass	
Accuracy:	±2°
Resolution:	0.01°
Max. tilt:	±15°

System components

- ADCP Sensor
- Data collection software WinRiver II
- Float
- Bluetooth interface

Power

10.5 - 18V_{DC}

Physical properties

ADCP Sensor

Weight: 4kg

Dimensions: Ø 16.5cm x 17.5cm length

Float

Weight: 10kg

Dimensions: 120cm x 80 cm x 18 cm (WxLxD)

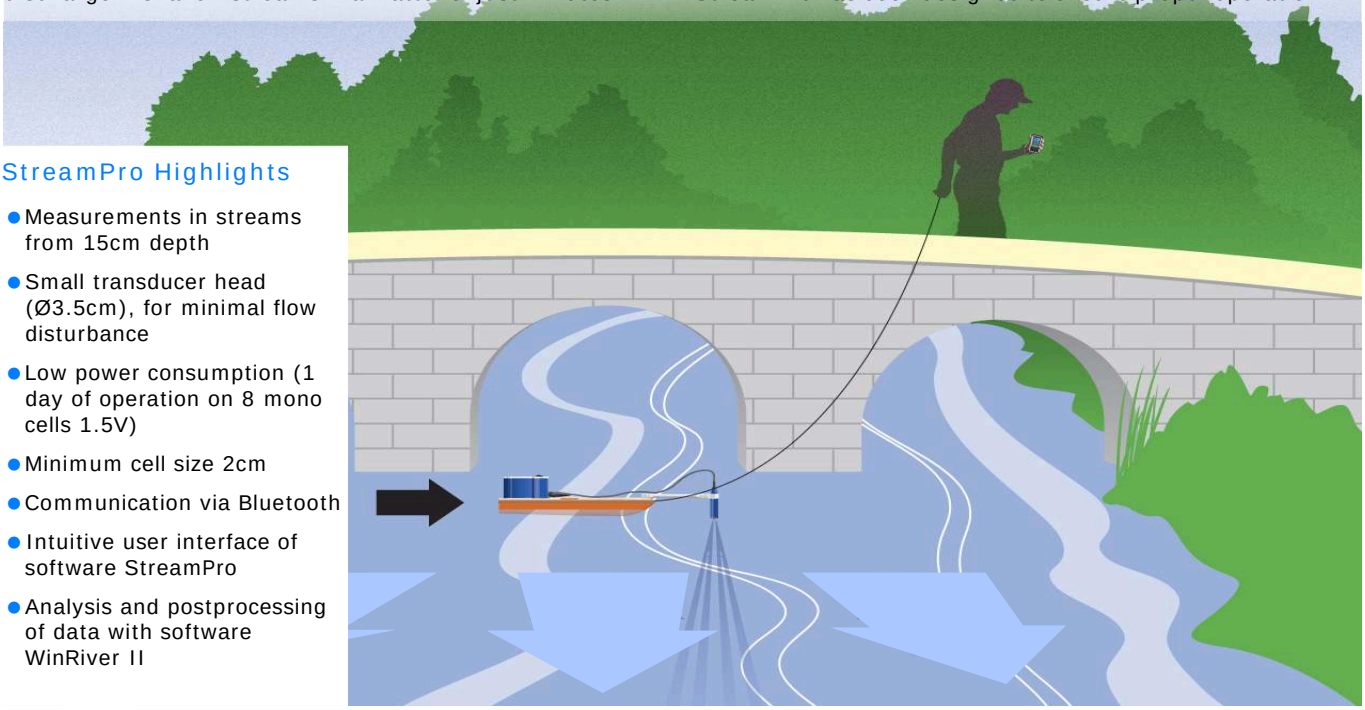
Options

- Section-by-Section module
- Communication via radio modem

StreamPro
Velocity and discharge measurement in shallow streams

The StreamPro ADCP (Acoustic Doppler Current Profiler) represents a revolutionary advancement in velocity and discharge measurement. Now you can accuratly measure discharge in shallow streams in a matter of just minutes.

StreamPro can be tethered to be pulled from a bridge or a cable way. It is easy to handle and therefore fast applicable. The simple and highly intuitive user interface of software StreamPro has been designed to ensure proper operation.



StreamPro Highlights

- Measurements in streams from 15cm depth
- Small transducer head (Ø3.5cm), for minimal flow disturbance
- Low power consumption (1 day of operation on 8 mono cells 1.5V)
- Minimum cell size 2cm
- Communication via Bluetooth
- Intuitive user interface of software StreamPro
- Analysis and postprocessing of data with software WinRiver II

Technical Data

System Components
- small transducer head
- electronics case
- float
- data collection software StreamPro
- bluetooth wireless
- SEBA-HDA

Power
10 to 13.5V_{DC} (8 x 1.5V mono cells or rechargeable NiMH batteries) for 8 - 12 hour operation

Physical Properties
Weight: 5kg incl. elektronic, sensor, boat and batteries
Dimensions:
electronic housing: 15cm x 20cm x 10cm
sensor: Ø 3.5cm x 15cm length
boat: 44cm x 70cm x 11cm (WxLxD)

Options
- Max. measuring depth extended to 4m
- Section-by-Section modul
- Stable Riverboat SP
- Cable Chimp for cable way

ADCP Sensors

Number of cells:	20
Cell size:	2-20cm
Min. depth:	0.15m
Max. depth:	2m (4m see options)
Accuracy:	±1.0% ±0.2cm/s
Resolution:	0.1cm/s
Measurement range:	±2m/s (±5m/s with Riverboat SP)
Frequency:	2.0 MHz
Geometry:	4 beams
Angle of beam:	20°
Beam width:	3°
Material:	Polyurethane

Bluetooth®

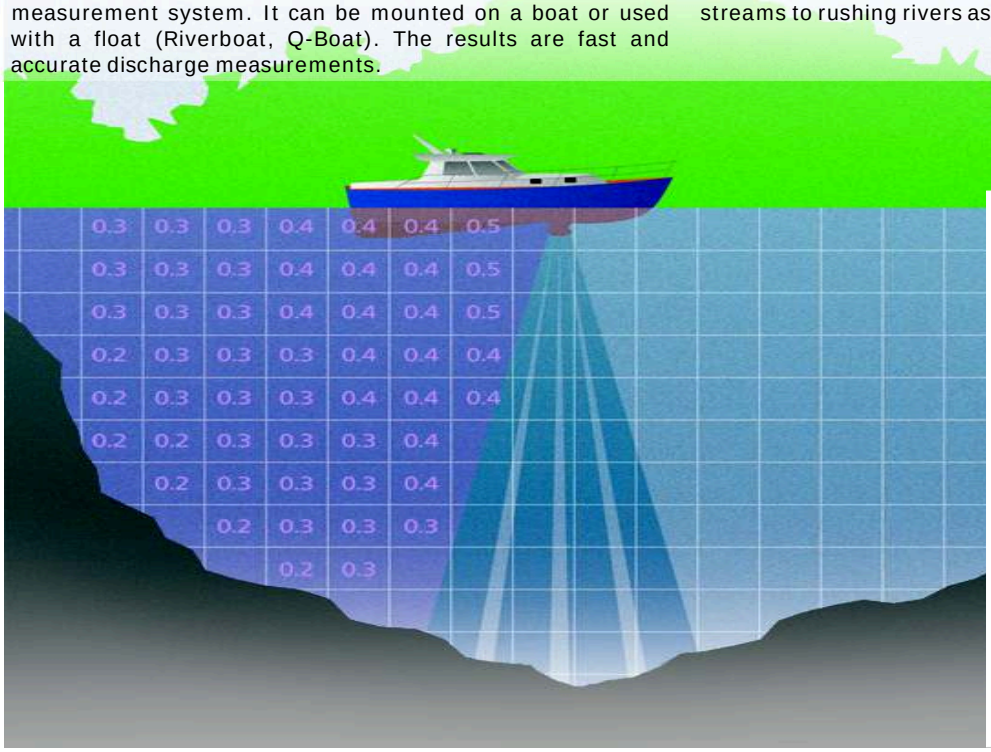
Integrated Sensor

Temperature measurement range:	-4°C bis 40°C
accuracy:	±0.5°C
resolution:	0.01°C

Workhorse Rio Grande
Versatile velocity and discharge measurement system for rivers

The Workhorse Rio Grande ADCP (Acoustic Doppler Current Profiler) is an accurate and comfortable discharge measurement system. It can be mounted on a boat or used with a float (Riverboat, Q-Boat). The results are fast and accurate discharge measurements.

The Workhorse Rio Grande measurement system can be used for a wide range of river conditions, from shallow (50cm) streams to rushing rivers as well as tidal estuaries.



Workhorse Rio Grande Highlights

- High discretisation of cells and fast transects for velocity and discharge measurement due to patented BroadBand technology of Teledyne RD Instruments
- Extendable with external sensors: (D)GPS, depth sounder, and external compass
- Large depth range profiling capability allows measurements in low and high flow
- Windows-based data acquisitions with display of all results

Technical data

ADCP Sensors

Number of cells*:	128/255
1200kHz system	
Cell size*:	0.05-2,0m
Min. depth*:	0.5-4.8m
Max. depth*:	4-26m
600kHz system	
Cell size*:	0.1-4.0m
Min. depth*:	0.7-9.2m
Max. depth*:	8-100m
Accuracy:	±0.25% of velocity (water and boat) or ±0.25cm/s
Resolution:	0.1cm/s
Measurement range:	±5m/s
Geometry:	4 beams
Angle of beam:	20°

*depends on measurement mode

Integrated Sensors

Temperature	
Measurement range:	-5°C to 45°C
Accuracy:	±0.4°C
Resolution:	0.01°C
Tilt	
Measurement range:	±15°
Accuracy:	±0.5°
Resolution:	0.01°
Compass	
Accuracy:	±2°
Resolution:	0.01°
Max. tilt:	±15°

System components

- ADCP sensor
- data collection software WinRiver II
- float (optional)

Power

10.5 - 18V_{DC}

Physical Properties

ADCP Sensor

Weight: 7kg

Dimensions: Ø 22.8cm x 20.14cm length

Riverboat

Weight: 7kg

Dimensions: 121cm x 81 cm (LxW)

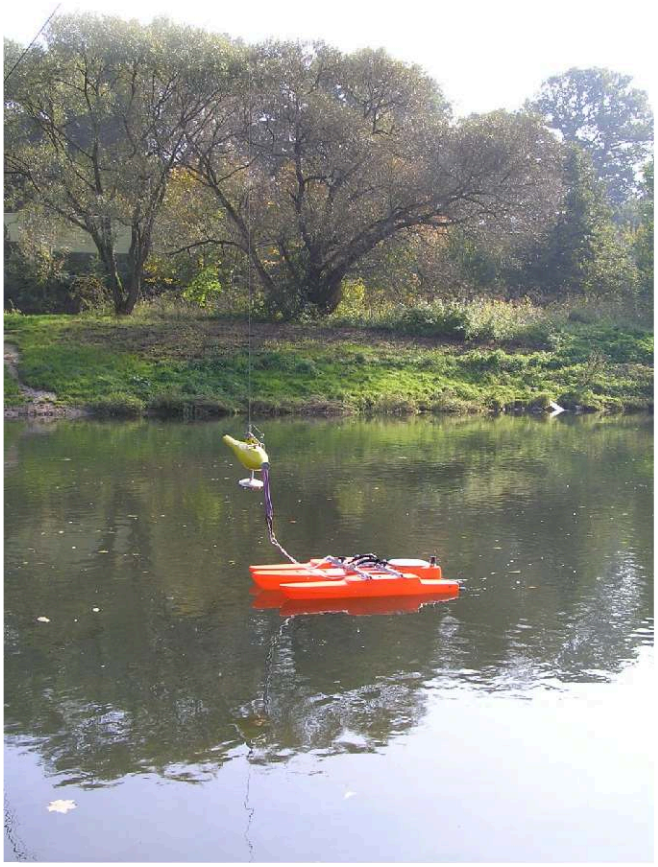
Options

- Bottom Mode 7: bottom tracking for shallow streams from 50cm depth
- Water Mode 12: for flow velocities >2m/s
- Section-by-Section module
- communication via radio modem
- remote controlled Q-Boat
- mounting fixture for rubber or motor boat

Comparison of mobile ADCP systems
RiverRay, StreamPro and Rio Grande

	RiverRay	StreamPro	Rio Grande
Number of cells	200	20 (30[1])	128 / 255[2]
Cell size	automatic, 10 - 80cm	2 - 10cm (2 - 20cm[1])	0.05 - 2,0m² / 0.1 - 4.0m²
Min. depth	0.4m	0.2m	0.6 - 4.8m² / 0.7 - 9.2m²
Max. depth	40m	2m (6m[1])	4 - 26m² / 8 - 100m²
Bottom Tracking	70m	4m (7m[1])	30m / 100m
Accuracy	±0.2cm/s or ±0.3%	±0.2cm/s or ±1.0%	±0.25cm/s or ±0.25%
Resolution	0.1cm/s	0.1cm/s	0.1cm/s
Measurement range	±5m/s	±2m/s (±3m/s with RiverboatSP)	±5m/s
Configuration	Phased Array		
Frequency	600kHz	2000kHz	1200kHz / 600kHz
Geometry	4 beams	4 beams	4 beams
Angel of beams	30°	20°	20°
Communication	Cable, Bluetooth, optional radio	Bluetooth	Cable, optional radio modem
Software	WinRiver II	StreamPro, WinRiver II	WinRiver II
Float	inclusive, optional Q-Boat 1800	inclusive, optional RiverboatSP	Riverboat, Q-Boat 1800, mounting fixture for rubber or motor boat
Expansions	Section-by-Section	Section-by-Section measuring range, compass-upgrade	Section-by-Section Water Mode 12 Bottom Mode 7
Options	(D)GPS		(D)GPS, depths sounder, external compass

[1] with extension of measuring range
[2] depending on measurement mode



(D)GPS - Differential Global Positioning System
Recording of cross-section coordinates in rivers

The (D)GPS upgrade is possible for Rio Grande with Riverboat, for RiverRay and Q-Boat 1800. In case of a moving bed it is recommendable to use (D)GPS instead of the Section-by-Section module. Furthermore the (D)GPS equipment is mandatory for recording of cross-section coordinates, e.g. for hydraulic modelling. The accuracy is highly depending on the quality of satellite reception and the correction signal.

Technical data
- Minimum reception of 4 satellite signals for determination of position
- Output format NMEA
- Data transfer to software WinRiver II

Accuracy
- GPS meter-accuracy
  With correction data (DGPS) submeter-accuracy
- RTK (Real Time Kinematic) mode centimeter-accuracy

Differential correction data
- Second GPS system at shore as reference station
- Geostationary satellites (EGNOS, WAAS, OMNISTAR)
- Beacon-stations
- Possible costs for correction signal

Power
10.5 - 28 V_{DC}

Physical properties
Receiver
Weight: 1.3kg
Dimensions: 24cm x 12cm x 5cm (WxLxD)

Cable Chimp
Remote-controlled system for crossing rivers

The cable chimp allows a slow and constant crossing of the ADCP systems and therefore ensures an accurate collection of velocity and discharge data. The system is remote-controlled from the river bank. The cable trolley can be used with the three ADCP systems RiverRay, Rio Grande and StreamPro. A discharge measurement at sites with bad access is thus easier. The cable chimp can also be used with existing cable way installations.

Technical data
- For Rio Grande and RiverRay at flow velocities up to 1m/s
- For StreamPro at flow velocities up to 3m/s
- Diameter of cable from 6 to 12.7mm
- Speed of drive 0.03 – 0.2m/s
- Range of remote control 30m
- Light and water-tight aluminium enclosure
- Max. grade 8°

Power supply
NiMH rechargeable batteries
Operation time:
- >2h at max. speed
- >3h at half speed

Physical properties
Weight: 2.2kg
Dimensions: 24.1cm x 35.6cm x 11.4cm (WxLxD)

Options
- Water-tight transport case
- Towing device for use at low flow velocities

RiverboatSP
Large float for small StreamPro sensor

Technical data

- Operation at flow velocities up to 3m/s
- Floating body made of polyethylene
- Cross bar made of anodized aluminium
- Large fins for high stability

Physical properties

Dimensions: 114cm x 81cm (WxL)

Options

- Padded nylon bag for transport

RiverboatSP is used with the StreamPro sensor. In addition to the standard floating body, the large float RiverboatSP is the ideal extension for determination of velocity and discharge measurements with StreamPro at high flow velocities. The conversion of StreamPro sensor and its electronic enclosure from the standard floating body to the RiverboatSP is performed easily with a few actions.

Q-Boat 1800
Remote-controlled velocity and discharge measurement

Technical data

- For operation with Rio Grande or RiverRay
- Two high-performance outboard engines
- Driving speed max. 5m/s
- Range of remote control 300m
- Robust, insubmersible, plane, V-shaped hull
- UV-resistant synthetic material
- Communication via radio modem

Power supply

NiMH rechargeable batteries
Operation time:
- 40 minutes at 4m/s
- 240 minutes at 1m/s

Physical properties

Weight: 25kg
Weight during operation: 40kg
Dimensions: 180cm x 89cm(WxL)

Options

- (D)GPS upgrade
  extendable with external depth sounder
- Camera upgrade

Q-Boat 1800 is a remote-controlled float for Rio Grande or RiverRay. Now, velocity and discharge measurements are even possible at impassable measuring sites. The Q-Boat 1800 allows a safe and uncrewed measurement in case of floods. The two outboard engines and the V-shaped hull ensure an easy control even in turbulent waters.

WinRiver II Software
Registration and analysis of discharge measurements

The software WinRiver II is used to record and analyse velocity and discharge measurements of mobile ADCP systems.

The configuration of the measurement system can be done by running the "Measurement Wizard". Site-specific settings and different modes can be chosen to adapt the measurement device to different river conditions.

After finishing the measurement, the playback menu offers the possibility to correct the measurement settings and to reanalyse the measurement. For the analysis itself, several tables and graphics are available.

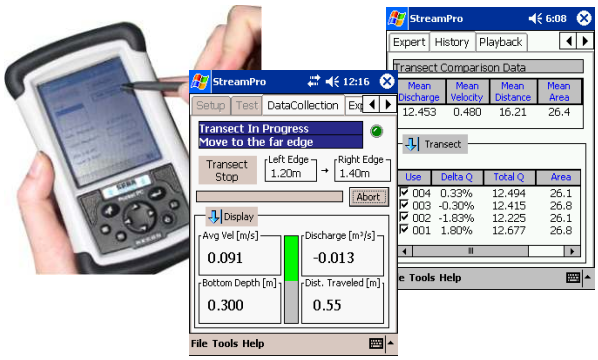
The software WinRiver II can also used for the operation with StreamPro in combination with a long-range SEBA bluetooth module.

StreamPro Software
Registration and analysis of discharge measurements with StreamPro

In combination with the SEBA bluetooth module, Software StreamPro can be used to record and compare measurements with StreamPro on your HDA (Hydrological Digital Assistent).

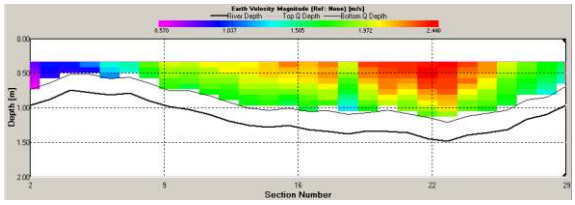
With the SEBA HDA as an easy-to-handle, lightweight and waterproof device, your mobile discharge measurement is sure to be an innovative experience. Our self-explanatory software StreamPro alleviates the measurement with your StreamPro. Tabulation allows a comparison and analysis of discharge measurements directly at site.

After finishing a measurement with software StreamPro, your data can be imported in WinRiver II easily and comfortably. Afterwards, the measurement can be managed and processed professionally as usual.



Section-by-Section Software
Registration and analysis of discharge measurements in verticals

The software Section-by-Section is used to record and analyse discharge measurements of mobile ADCP systems in verticals.
With Section-by-Section software, water velocity and depth data is actually acquired at a series of fixed locations across the measured body of water.With Section-by-Section, the specific verticals were analysed and the total discharge is determined. Because Section-by-Section is similar to conventional measurement methods, it's extremely easy to learn.



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