

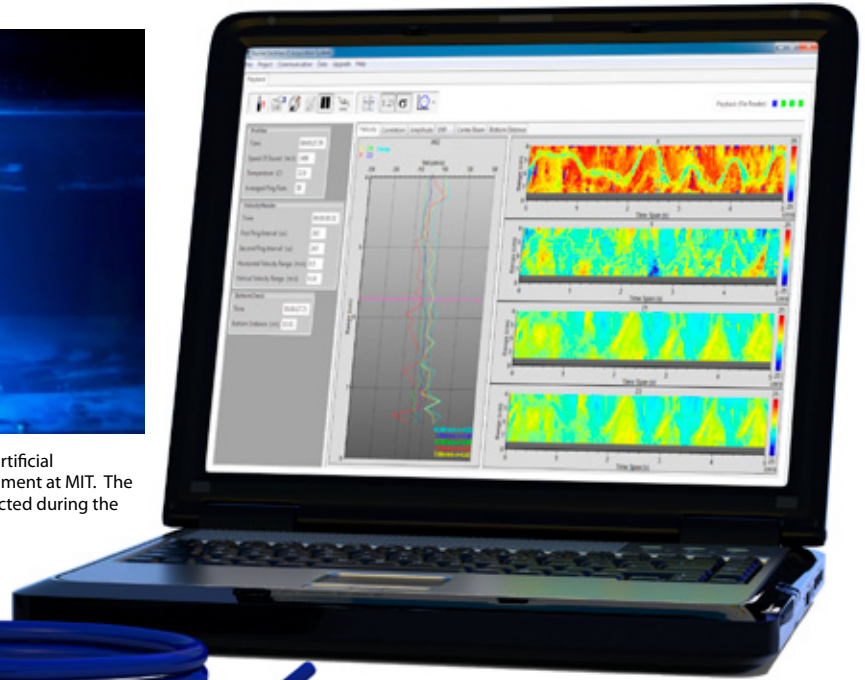
The Nortek Vectrino II provides new and unique opportunities for high resolution profiling velocity measurements in the laboratory and in the field. With 1 mm vertical resolution over a range of 30 mm, the Vectrino II moves beyond the classical acoustic Doppler velocimeter and opens the door to new types of velocity measurements.

Vectrino II

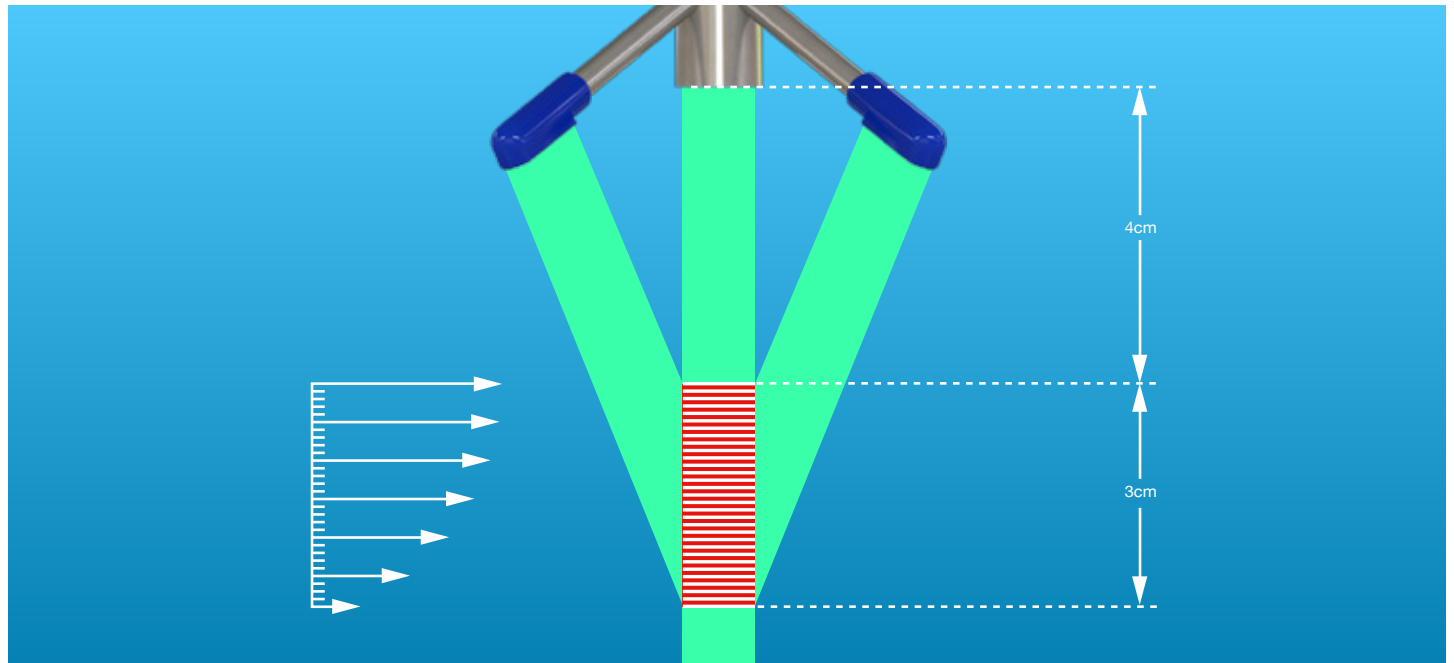
3D Profiling Velocimeter



Vectrino II measuring the flow over an artificial seagrass during a demonstration experiment at MIT. The computer shows an image of data collected during the experiment.



The Vectrino II comes with enhanced data collection and display software

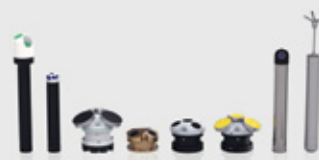


The Vectrino II profiles the water column over a 3 cm range and provides three-component velocity observations with a resolution as fine as 1 mm and sampling rate as fast as 100 Hz. The Vectrino II can measure the distance to the bottom at rates of up to 10 Hz by interleaving bottom detection pings and velocity profiling pings. New interface software provides enhanced capabilities such as real-time plots of velocity profiles, velocity standard deviation, energy spectra and color contour plots.

CURRENT AND WAVE MEASUREMENTS IN THE OCEAN, LAKE AND LABORATORY



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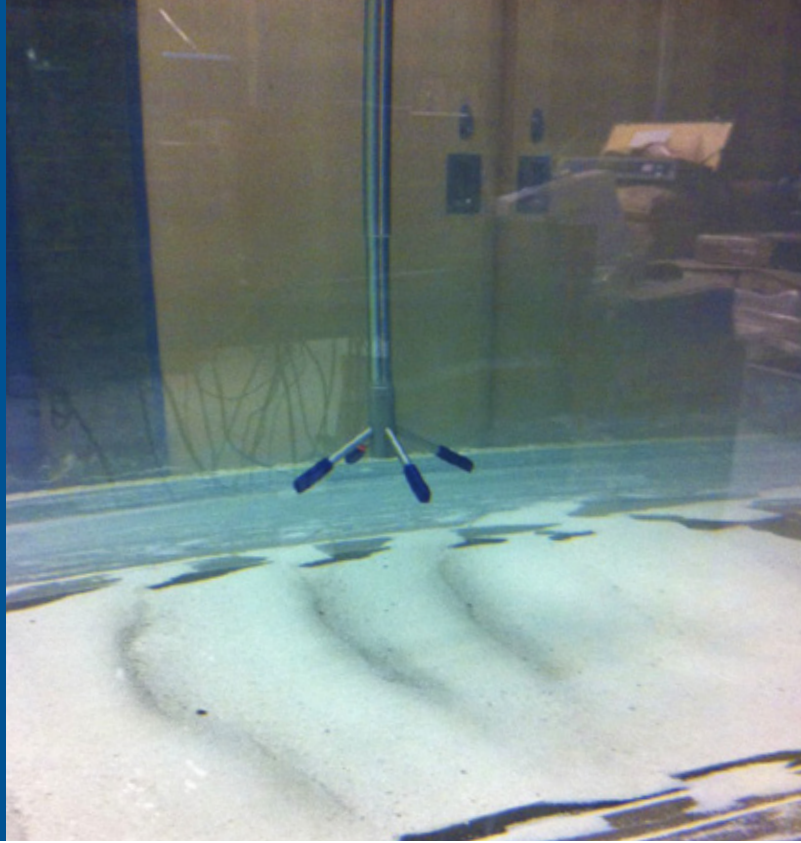


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True innovation makes a difference

Vectrino II

The next level in acoustic Doppler velocimetry

With the Nortek Vectrino II we have added profiling capability (30 mm range) to classical acoustic Doppler velocimetry. Designed from the ground up to take advantage of advances in modern electronics hardware, we have also made a leap in temporal (100Hz) and spatial resolution (1 mm). Add to this the excellent performance of acoustics in sediment flows and the Vectrino II leaves you free to pursue data collection schemes that were previously reserved for more complex and expensive technologies.

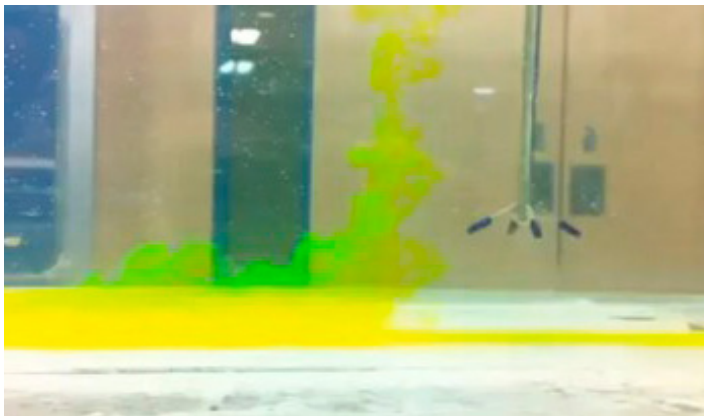


Boundary Layer Measurements

The Vectrino II is well suited for measuring near boundaries, able to capture a velocity profile at 1 mm resolution over a 30 mm profile. The 100 Hz sample rate allows visualization of structures within the flow providing a well resolved spatial and temporal data set for analysis. Coupled with the interleaved bottom distance measurements, the Vectrino II can be used to determine bed stress and boundary movement during erosion studies.

Adaptive Ping Interval

Pulse coherent profilers are susceptible to pulse interference when measuring near boundaries. The Vectrino II is able to dynamically configure the pulse intervals by examining acoustic returns and identifying interference regions. The Vectrino II can perform an adaptive check once at the start of data collection or continuously at intervals from 1 second to 1 hour. When measuring near dynamic boundaries which are eroding or accreting during data collection, or during the passage of bed forms, this is a valuable feature to improve data quality and reduce interference.

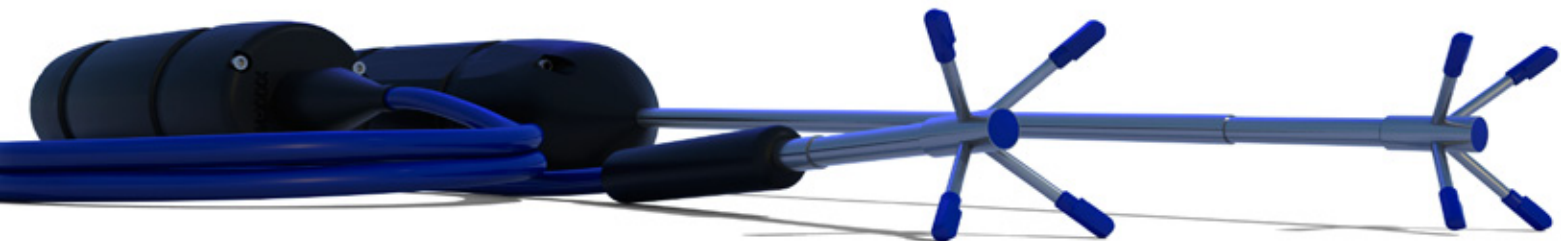
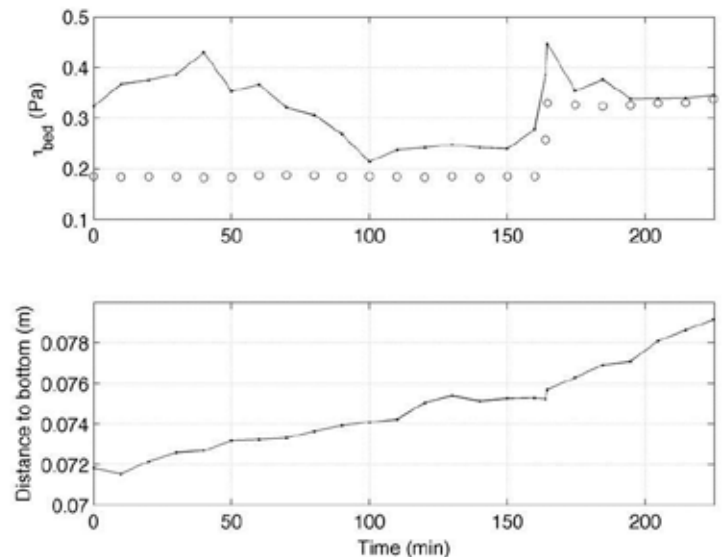


In this demonstration experiment at Cornell University, yellow dye is used to illustrate the flow structure. The Vectrino II can measure the flow velocity as close as 3-4 mm from a solid boundary.

Interleaved Distance Measurements

The Vectrino II measures distance to a boundary using a special bottom ping interleaved at a sample rate up to 10 Hz with velocity measurements. Measurement range is user selectable, starting 20 mm from the central transducer while maximum range is limited by the boundary echo strength. Typically, a range is specified and divided into 1 mm range cells, resulting in an accuracy of 0.5 mm over a variety of surfaces. The ability to measure boundary distance on the same time scale as the velocity measurements allows the velocity measurements to be referenced to a coordinate system that moves as the bed geometry changes.

Estimation of bed shear stress (top) and measurement of boundary movement (bottom) during an erosion study at Cornell University.





Field experiment with Vectrino II at UNC – Chapel Hill

Wave Flume

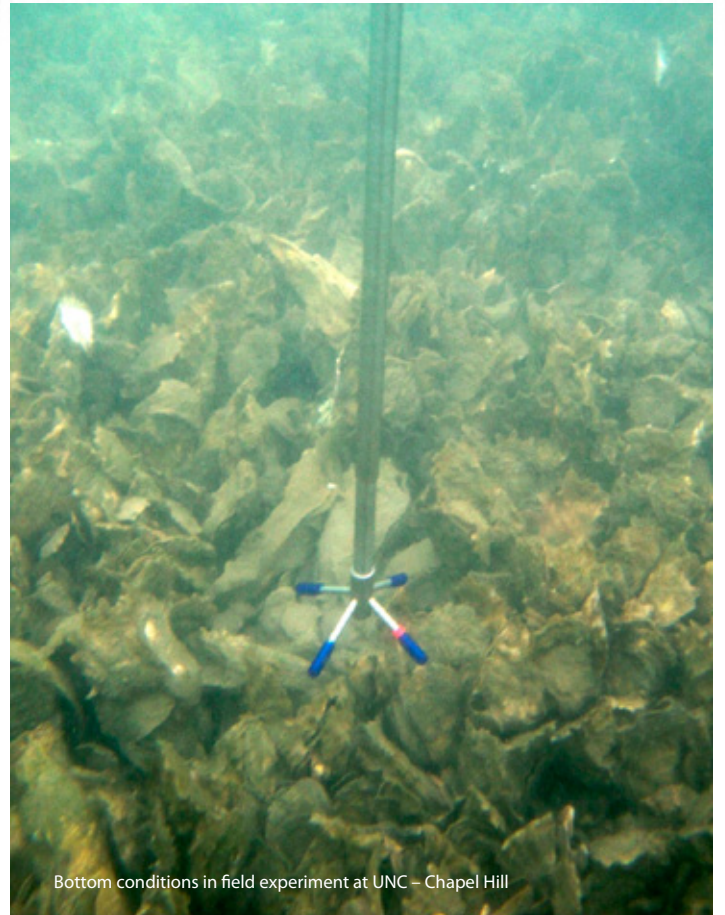
The Vectrino II is well suited for measurements in wave flumes. The profiling capability allows multiple instantaneous observations over the wave boundary layer for each wave passing by and reduces the need for multiple individual instruments or repetitive test runs. The profile of velocity will also help to characterize flow around or behind a structure such as scale piling or bulkhead. Finally, the real-time velocity energy spectra can be used to monitor wave energy in the frequency domain.

Field Experiments

The Vectrino II has many uses in outdoor field experiments. Outstanding measurements have been made in the shallow swash zone, in the bottom boundary layer above a muddy tidal channel, and over various substrates such as sand ripples, and sea grass and oyster beds. The distance measurement feature allows the Vectrino II to be positioned precisely above the bottom even in poor visibility conditions. High-speed communication and power supply are possible over cable lengths up to 100 m.



Demonstration experiment in wave flume at University of Quebec, INRS-ETE



Bottom conditions in field experiment at UNC – Chapel Hill

