



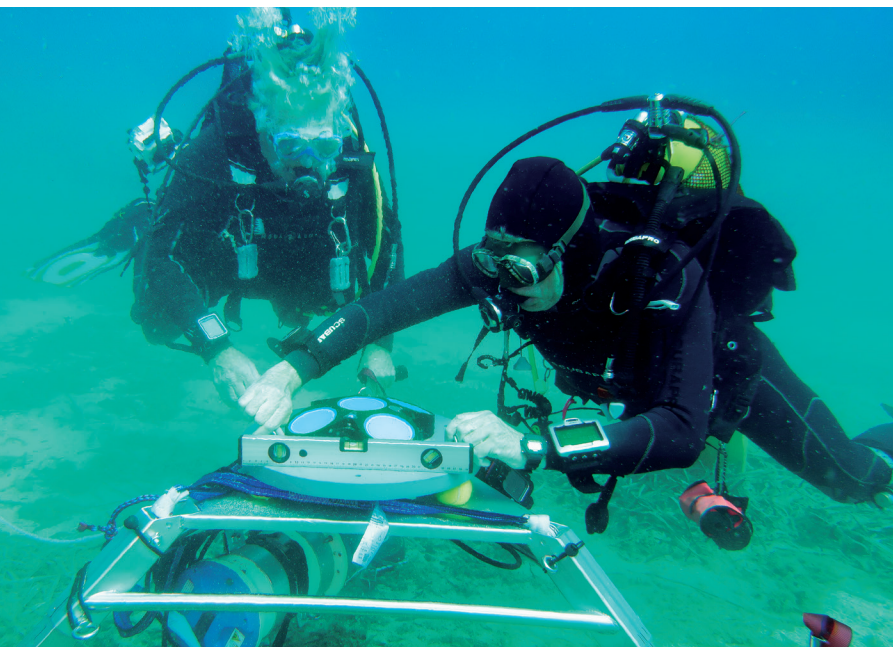
TELEDYNE MARINE
RD INSTRUMENTS
Everywhereyoulook™

WORKHORSE **proteus**

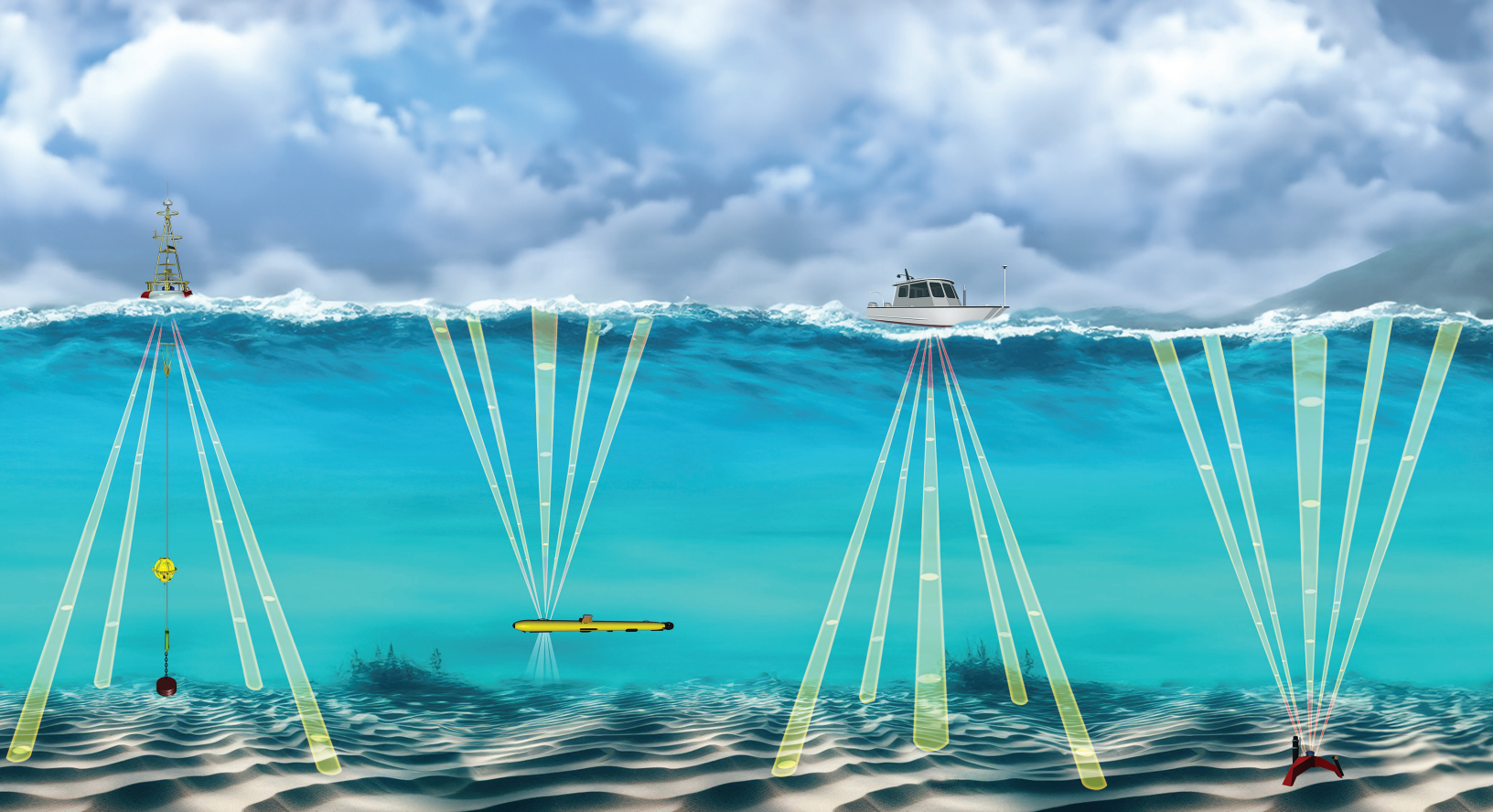
Your instrument for
the changing ocean

The **Workhorse Proteus** from Teledyne RD Instruments (RDI) collects current and wave data, measurements of flow, transport, and discharge, in oceans, estuaries, and rivers. Proteus is the evolution of Teledyne RD Instruments' original Workhorse ADCP, which revolutionized physical oceanography, ocean engineering, and river hydrology with its acoustic Doppler technique.

With the processing horsepower to simultaneously sample at multiple spatial and temporal scales, Proteus can unlock a new understanding of waves, turbulence, and the changing currents below the surface. Proteus has RDI's reliable bottom-tracking velocity ping to allow moving boat surveys or ice keel tracking while also taking advantage of a very low power sleep state to allow multi-year durations on alkaline battery power. It has flexible onboard processing to allow your sampling to continue to evolve in response to a changing ocean.



Proteus continues RDI's proven track record of over 40 years of data quality and reliability. Its technical advantages deliver the most data possible with a single instrument, both in terms of useable data per ping and the number of different ways a single system can be used. With ample, actionable data, Proteus can help you analyze and act with ease and confidence, knowing you have gathered the best possible information about the environment.



Unique Value that Workhorse Proteus Offers: Features and Benefits

Proteus Advanced Doppler Sonar Platform (ADSP) The newest, most advanced Doppler processing platform. Enables smaller form factor. Capability for more sophisticated pinging and sampling schemes to achieve precise research goals.

Catalyst Processor Fast processing. Easy to integrate and communicate with your electronics platform. Reliable data logging. Future potential for adding capability to the ADCP. Apps that could deliver critical real-time data.

New RDI AHRS and Dynamic Bin Mapping Better orientation compensation leading to more accurate data and more conclusive scientific results.

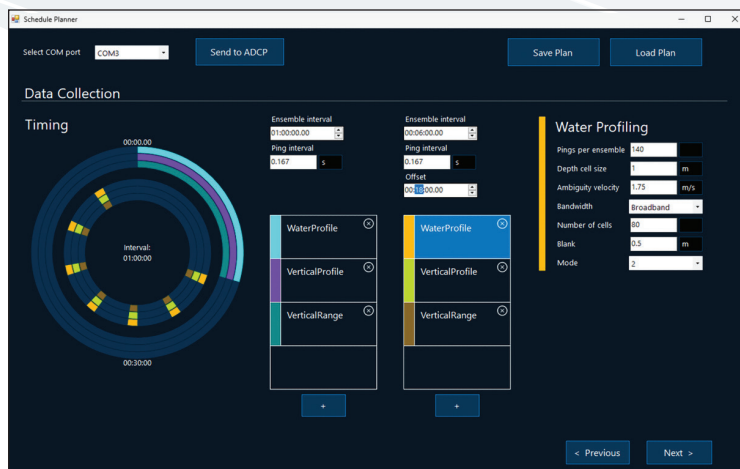
Elegant Planning Software Proteus can be used by anyone, even non-ADCP experts. Meets the needs of a workforce that is increasingly new, with diverse experience and education levels. (Traditionalists, don't worry; it "speaks" RDI's standard protocol too.)

Five Beams for direct measurement of ocean's vertical velocity Vertical profiling with high-precision velocities and high-resolution echo for sediment, biological, and wave measurement applications under wide-ranging conditions. Expands your research and collaboration capabilities.

Versatile Deployment Options No other ADCP can match the Proteus in the variety of applications and operational needs a single instrument can serve. Time and cost savings accrue with each new project or change in deliverable.

RDI's Broadband Techniques—robust, accepted, repeatable Makes Proteus the instrument you can stake your research reputation on.

Multiple Communication Options—combined serial and ethernet on single instrument Easy to integrate and communicate with your electronics platform, now and in the future.



1200 kHz Proteus ADCP
Diameter: 14.4 cm (5.65 in)
Total Height, including connectors: 17.2 cm (6.77 in)

What is an ADCP?

An Acoustic Doppler Current Profiler (ADCP) uses sound waves to measure water currents (speed and direction), bathymetry, and the distribution of particles such as sediment and plankton in the water column. Oceanographers rely on the ADCP to better understand ocean transport, mixing, and turbulence while ocean engineers use it to measure waves to design ocean structures and calibrate numerical models of sediment/pollutant transport. Since RDI's introduction of the first ADCP to the market in 1982, our technology has continuously evolved to make the system easier to deploy in the field. Our advanced algorithms turn ADCP data into actionable information on the ocean currents, waves, and turbulence. With more decades of innovation and experience than any other company, Teledyne RD Instruments is the trusted leader in ADCP technology.

How Workhorse Proteus Works — Why it's the most technologically advanced ADCP

The Workhorse Proteus ADCP is an innovative oceanographic research tool with two key Doppler processing components: The RDI Advanced Doppler Sonar Processor (ADSP) board and Catalyst edge processing capability. The ADSP board expertly handles the front-end sampling of water velocity profiling pings, classic bottom tracking, new boundary detection and water column processing, passing raw information to the Catalyst board. Catalyst builds on RDI's 40-year proven bin mapping algorithm by using dynamic tilt measurements from a new AUV/ASV-suitable

Attitude and Heading Reference System (AHRS). Catalyst enables superior transformation into the earth coordinate system, and ensemble averaging for high precision velocity profiles. Catalyst's processing power has the potential to produce turbulent Reynolds stresses, directional wave information, or other higher order parameters. Its flexible design allows algorithms to run either inside the ADCP for real-time decision-making or within the ADCP utilities software for in-depth post processing.



Specifications

Profiling Range*
(long-range mode, high-resolution mode)

Bottom Tracking (BT) Range*

Velocity Accuracy (Profiling and BT)

Cell Size

Minimum Blanking

Max Sampling Rate**

Max Sampling Rate with Five Beams

1200 kHz		600 kHz		300 kHz	
17 m	13 m	65 m	50 m	166 m	126 m
27 m		103 m		280 m	
0.3% of measured value +/- 0.3 cm/s		0.3% of measured value +/- 0.3 cm/s		0.5% of measured value +/- 0.3 cm/s	
0.05-4.0 m		0.1-6.0 m		0.2-8.0 m	
0.2 m		0.4 m		0.5 m	
16 Hz		8 Hz		4 Hz	
8 Hz		4 Hz		2 Hz	

PROFILE PARAMETERS

Velocity Resolution: 0.1 cm/s
Velocity Range: ± 5m/s (default); ± 20m/s (maximum)
Max #of Cells: 255
Precision at default cell size: 3.6 cm/s

TRANSDUCER & HARDWARE

Beam Angle: 20°
Configuration: 4-beam, convex; 5th beam vertical
Depth Rating: 300 m
Materials: Transducer, housing, and end cap: plastic; all titanium hardware
Connector: Metal shell; 8-pin MCBH
Communications: Ethernet (802.11 b/g/n/TCPIP) and configurable RS232/422 (both are standard features)
Recorder: 64 GB Micro SD card

ENVIRONMENTAL

Operating Temperature: -5°C to 45°C
Storage temperature (without batteries): -30°C to 60°C

SOFTWARE

Included Teledyne RDI Software: ADCP Utilities (view options for real-time data and recorded data)

ECHO INTENSITY PROFILE

Vertical Resolution: Depth cell size
Dynamic Range: 80 dB
Precision: ±1.5 dB
Independent high-resolution echosounder ping

STANDARD SENSORS

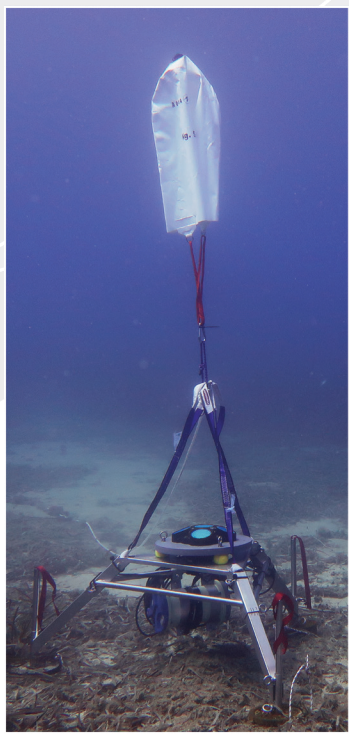
Temperature: Range -5°C to 45°C; Precision ± 0.5°C; Resolution 0.01°
Heading (AHRS; solid state magnetometer): Accuracy 2° RMS <20°, Resolution 0.01°
Tilt (AHRS; MEMS accelerometers): +/- 2 deg (dynamic), +/- .5 deg (static, <30 deg)
Pressure Sensor: Range 300 m, Accuracy 0.1% FS / better than 0.002% of full scale

POWER

External DC Input: 12-48 VDC
Internal Battery Voltage: 29 VDC new
Battery Pack at 0°C: 510 watt hours

*Ranges specified are typical at temperature 5°C and salinity 35 psu, using maximum transmit voltage.

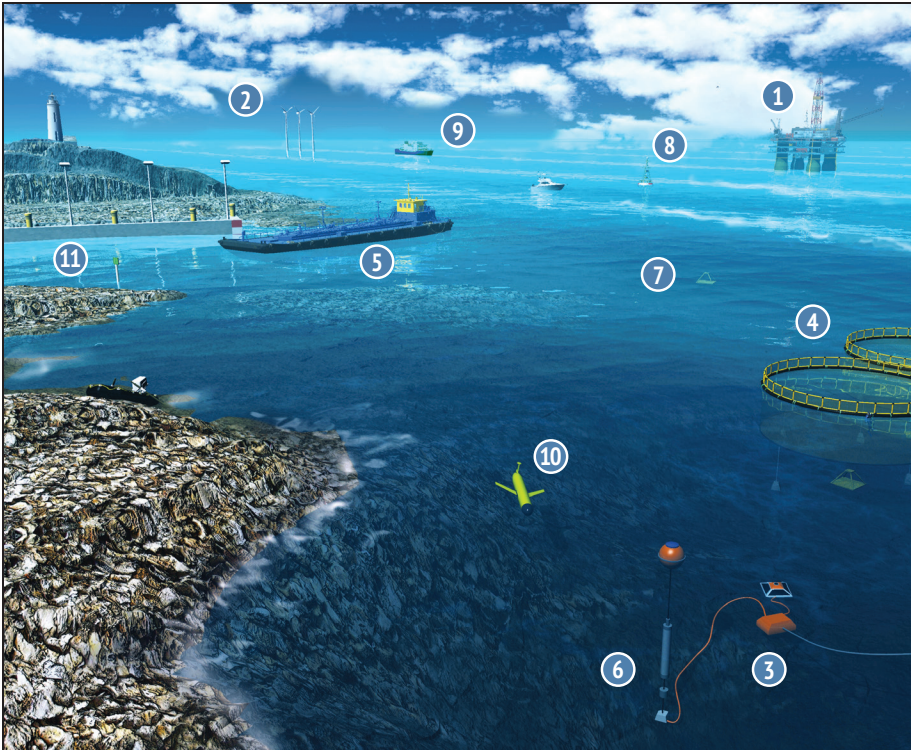
**Stated rates using limited profiling range.
1200kHz: 4m. 600kHz: 10m. 300kHz: 80m



These are the major challenges that Workhorse Proteus helps you meet

- Obtaining the right, exact data for your research goals, now and in the future
- Features you need for time-efficient, cost-effective fieldwork
- The ADCP you can trust with your important projects

Where Workhorse Proteus is used to collect current and wave data



- 1 Offshore Oil & Gas
- 2 Renewable Energy
- 3 Biological Oceanographic
- 4 Fisheries / Aquaculture
- 5 Navigation Safety
- 6 Coastal and Ocean Engineering
- 7 Ocean Observatories
- 8 Deep and Mid-Water Moorings
- 9 Oceanographic Research Vessels
- 10 AUVs and Gliders
- 11 Inland: River Hydrology, Environmental Impact Studies, Flood Warning, Civil Engineering Infrastructure Studies, Circulation Studies

Teledyne RD Instruments, founded in 1982 and a part of Teledyne Marine, designs and manufactures wave measurement, current profiling, and precision navigation solutions. With a staff of over 100 scientists, engineers, technicians, and sales and support personnel, the company's San Diego-based global headquarters is an 80,000 square-foot ISO-9001:2015 facility that includes state-of-the-art engineering, laboratory, manufacturing, and test areas. RDI developed the industry's first commercially available ADCP in 1982. RDI's game-changing technology has allowed tens of thousands of scientists, engineers, and researchers to explore and understand our world's oceans, rivers, and streams in a way that was previously thought impossible.



TELEDYNE MARINE
RD INSTRUMENTS
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RDI also has personnel or partners in Canada, Asia Pacific, Middle East, Africa, and Latin America.

