

RDI's Unique Advantages



RD Instruments
Acoustic Doppler Solutions

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Subject: Summary of Mode 12's Improved ADCP Advantages

What is Mode 12?

Mode 12 is an operational mode that allows RDI's ADCPs to measure fast flows in shallow gauging sites. Like Mode 1, Mode 12 can measure a large range of flow velocities. But Mode 12 uses smaller depth cells, making it capable of taking measurements in much shallower flows. While Mode 5 also allows measurement in shallow flows, it can only deal with a slower range of velocities.

How Does Mode 12 Work?

Mode 12 works by reducing the size of the depth cell, making it possible to measure the highly sheared profile of fast flows near boundaries.

In Mode 1, small depth cells can result in noisy data unless the operator has the time to perform long averages. Mode 12 gets around this by increasing the ping rate, allowing the depth cell size to be small without increasing the averaging time or data noise.

Why Not Use Mode 12 All the Time?

Because of the algorithms involved, Mode 12 is not suitable for applications where the orientation of the instrument will change, especially if the heading is not reasonably steady.

In Mode 12, each ping consists of a sequence of sub-pings, which are summed and then converted to earth coordinates using a conversion matrix (which is dependent on orientation data). Because orientation is checked only once per sequence, it is assumed that the orientation will remain constant during that sequence. If the orientation changes significantly during the sequence, the assumption is not met and the calculation will be inaccurate.

Ancillary Advantages

Although originally developed for swift and shallow, Mode 12 has distinct advantages in other applications as well:

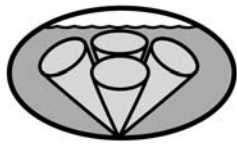
- Rapid sampling
- Reduced noise in low-velocity measurement data
- Reduced power consumption

Rapid Sampling

By increasing the ping frequency, Mode 12 allows greater deployment flexibility. For example, an increased sampling rate could improve temporal resolution in turbulence studies.

Reduced Noise

Noise reduction can be realized by using Mode 12 for low-velocity measurements when the heading data are reasonably steady.



Reduced Power Consumption

An ADCP operating in Mode 12 will consume less power for a given ping rate than one operating in modes 1 or 5. This is because Mode 12 queries the orientation sensors less frequently. In some cases, battery life can be doubled, allowing the collection of more data or the planning of a weather window at the end of the deployment.

To see how Mode 12 will improve your ADCP's performance, download the new planning software from RDI's website at: <http://www.adcp.com>