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Recording time is about 18 minutes

Slide 1: (Slide Intro)
Welcome. This is a podcast produced by the USGS Hydroacoustics Work Group on programming Side-looking Acoustic Doppler Velocity Meters (ADVMs). This podcast is specific to programming the SonTek ADVMs; using the vendor provided software. Keep in mind that the use of trade names does not imply endorsement by the USGS.

Slide 2: (Slide reviewing key information and channel features part1.)

Before programming a new site it is necessary to have completed a reconnaissance of the channel in the vicinity of the ADVM and based on that data your should have determined your measurement volumes for the ADVM. The measurement volume, how much of the stream your instrument will measure, is a key item that the programmer should be familiar with before programming the instrument.

This slide has three screen captures (1) a diagram illustrating the measurement volume (2) a beam check example and (3) cross sectional data from an ADCP. Beam checks and ADCP Data are useful tools for determination of the measurement volume.

Slide 3: (Slide review of channel features part 2.)

Before permanently programming a site ADVM the hydrographer should be familiar with;

- -Distribution of velocity within the channel ,
- -Obstructions and boundaries ,
- -Wake or flow disturbance especially in regards to the cell begin, and
- -Whether there is a sufficient amount of "scatterers" in the water to reflect the acoustic signal at a level that is substantially above the instrument's noise level

This presentation focuses just on a review of the software necessary to program the instrumentation.

Slide 4: (Slide covering Key terms)

Let's review some of the basic terms we will use when programming ADVMS.

Sampling Interval – how often the ADVM measures for example if the SI is set to 10 minutes it will measure ever 10 minutes. Note when in SDI 12 mode the Data logger will control the sample interval.

Averaging Interval – how long the ADVM samples every time it measures. This is controlled by the settings in the SonTek regardless if it is in SDI 12 mode or RS 232 mode.

Range Averaged Cell – the total measuring volume.

Cell Begin – the start of the range-integrated sampling volume

Cell End – the end of the range-integrated sampling volume

Blanking distance – the start of the first multi-cell

Cell Size – the size of each individual multi-cell (bigger cells are usually better, the bigger the cell the lower the standard deviation of the velocity measurement)

Number of cells – determines where the multi-cell data ends

Mutli-Cell/Profile Data

Slide 5: (Review of Sampling Interval)

Let's take a moment a review sampling interval in more detail

The sampling frequency or interval should be short enough in order to measure the changes in the signal you want to measure. In other words you want to make sure the sampling interval is set so that the data can be used to accurately reconstruct the true shape of the flow signal you are measuring.

For rapidly changing sites the maximum sampling interval is usually 15-minutes

It is possible that in some flashy small streams a smaller interval the 15 minutes may be necessary to catch all events in rapidly changing conditions.

Keep in mind what you are trying to measure.

Slide 6: (Review of Averaging Intervals)

Factors to consider when determine averaging interval
1. Flow regime – steady or unsteady flow, unsteady flow requires sampling a greater percentage of the time, i.e. longer averaging intervals
2. Turbulence – turbulent sites may require longer averaging intervals to minimize turbulent velocity fluctuations
3. Appearance of the data a longer averaging interval can result in smoother appearing data
4. Longer averaging intervals will consume more power, which may be an issue
5. SDI-12 considerations – you will need some buffer time for SDI-12 to transmit the data after averaging

In the plot on this slide the smoothness of the data was improved by increasing the Averaging interval from 1 minute to 10 minutes.

Slide 7: (Slide showing hydroacoustics web site link -> Web Page -> then how to retrieve needed programs)

SonUtils is an executable program that runs on personal computers running the Microsoft Windows

0perating system. SonUtils is an utility programs for "talking" directly to the instrument, downloading data from an internal recorder, collecting Beam check data and calibrating the internal compass/tilt sensor, for use with any SonTek Argonaut meter,

Software and firmware can be downloaded by going directly to the manufacture's web page. http://sontek.com

To obtain the most current USGS approved version, you can visit the USGS Hydroacoustics Web Page at http://hydroacoustics.usgs.gov/. Let's go through the steps fro down loading via this link which is the preferred link for USGS staff.

Once the page loads, you navigate to the SonUtils download link by selecting the Software link under the Index Velocity section on the left side of the page. Near the top of this page there are links to selected vendors. Select the link for SonTek Software and you will be directed to the portion of the page where the AreaComp download link is listed. Click on this link and you will be prompted to Open or Save the file. Select the Save option, then browse to an appropriate location on your local computer. You should have both the SonUtils program and ViewArgonaut program installed on the computer.

View Argonaut software can also be used for deployment, and for system diagnostic but is also has the added feature of having a processing functionally for your data sets.

To install the programs you will need to have administration rights on your computer.

As noted on the web page "Links to the manufacturer's software and firmware are provided primarily as a service for USGS users. However, in some cases, access has also been provided for other agencies, with the manufacturer's permission. USGS users should also note that these links provide access to only manufacturer's software and firmware that the OSW recommends. In some cases, the version of the software provided here may not be the latest software available from the manufacturer. This is either because the latest software has not been tested by the OSW or because it has a known problem."

Slide 9: (Intro slide for SONTEK programs)

IF your SonTek has been connect to a data logger most likely is in SDI_12 mode. The user needs to switch to RS-232 mode. The first step is to connect the white jumper on your ADVM cable.

Once connected let's navigate to and open the SonUtils program.

Select your com port and the default baud rate of 9600
Select the "break" tab to initiate a system break.

Break
Clicking the **Break** tab will send a signal to the currently selected instrument.

This signal will awaken/initialize the instrument and simultaneously stops **any data collection**

that may have been in progress.

After a successful **<BREAK>** signal has been sent, the instrument will respond with prompt letting your know it is in SDI-12 mode and it is necessary to type ?EXIT! to switch to RS232 mode for direct communication/.

You do not have to but you can press the Break tab again and it will "wake up " the instrument. You can also use Alt+B as a shortcut Key for this exercise.

Show Configuration

Clicking the **Show Configuration** tab (or entering **show conf** on the command line) will display the hardware configuration parameters for the selected instrument. The example we are showing today is based on a SW system. Some parameters will changed based on the instrument type

Show Setup

Clicking the **Show Setup** tab(or entering **show setup** on the command line) will display the current instrument setup parameters for the instrument. This tab and the next Show Deploy are used for programming the instrument.

Know that we have review some of the key features of the program let's program our instrument.

It can be handy to have either a tip sheet like the one I have on my computer or the Argonaut manual handy for a reference for the commands.

Once connected to an instrument in SonUtils it is a good idea to make a log file for future actions. Under the file tab you can turn the log feature on. Give the log file a name that can easily be reference later in my example I used an USGS station number for the site and the date. Under setup parameters let's change the SI for one sample every 15 minutes and the AI for the instrument to 3 minutes.

Let program our instrument by first starting with the setup commands. It may be a good idea to look at the tip sheet. Under setup commands the first three commands are for Temp, Salinity and Temp mode. Normally you will set the temp mode to measure so the instrument measures the temperature salinity is set to 0.0 ppt usually. In a high salinity environment you can set it to a normal expected salinity but once set you should not change it.

Cell Begin let's set to .1 meter and Cell end to 5.1 meters based on our pre-determine sample volume for the site.

For XR and SW units you usually want to set the dynamic boundary to ON. DBA on Reverse X Velocity if you need to change the definition of + x velocity relative to the sensor (SL and SW units)

Power Ping should usually be set to ON to help improve the velocity performance.

Set Profiling Mode to Yes
N Cells let's set this for 5
Cell Size 1 meter. If profiling mode is ON total cell size for the number of cell will be length of range cell by default

Our instrument is setup. Let's review the setup and then look at the Deployment. You can set the deployment name. For this case lets name the deployment "Test" The name can be up to 5 characters. This name will be associated with all the data files.

SDI command can be used to set the data and ST for time. However if deploy in SDI-12 mode the data logger will control the start time and date. AI and SI should already be set.

WE are no ready to deploy our instrument. Let's review our setup again.

Before we leave the unit let's review a couple of other tabs.
Set time can be used to set the instrument to your current laptop time.
Recorder tab will bring up the recorder dialog box. IN the dialog box you can review the number of files, amount of free space available, and download or format (erase) as necessary.

Now we are ready to deploy the instrument . IN this "test" case we will deploy in SDI 12 mode. Confirm that the address is set correctly (default is zero) by typing sdi12address

By typing SDI12 on will place the instrument in sdi12 mode (default address zero)

You will no longer be able to communicate with the instrument without sending another "break" and switching back to RS232 mode.

As a last step you can turn off your log file and exit the program. Your data logger should have the data after the next sample time has passed.

ADVM Configuration Summary

In summary know your Instrument capabilities and functions
 Know Determine cell begin and cell end, choose sampling interval, choose averaging interval, when possible collect multi cell data. Transmit and store the maximum amount of data and continually review your data.