SETUP of the IMAGENEX DELTA T Profiling Sonar System.

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Introduction.

The Imagenex DELTA T Sonar is a development prototype for a new range of products from Imagenex. The system consists of an underwater sonar head connected by Ethernet directly to a PC type computer and 24 Volt power supply. In the typical installation the power supply and PC are supplied by the customer. The cable which comes with the unit has an underwater mateable connector for the sonar side, and a standard RJ45 connector for the Ethernet. The cable is currently made up with bare wires for power, red goes to positive, black to negative. The sonar head uses approximately 0.2 A at 24 Volts, and we recommend a 1.0 Amp power supply.

Hardware Installation.

Sonar Head (120 Degree Profiling type):

For producing sensible profiles of the seabed, the sonar head should be mounted transducers down (the transducers are in the gray plastic). Refer to *Figure 1* and *Figure 2* for the Xdcr Position setting for your installation. If the Xdcr Position setting is incorrect, port-side data will be displayed on the starboard and vice-versa. The 'up/down' setting in software can be switched if the sonar must be mounted the opposite way.

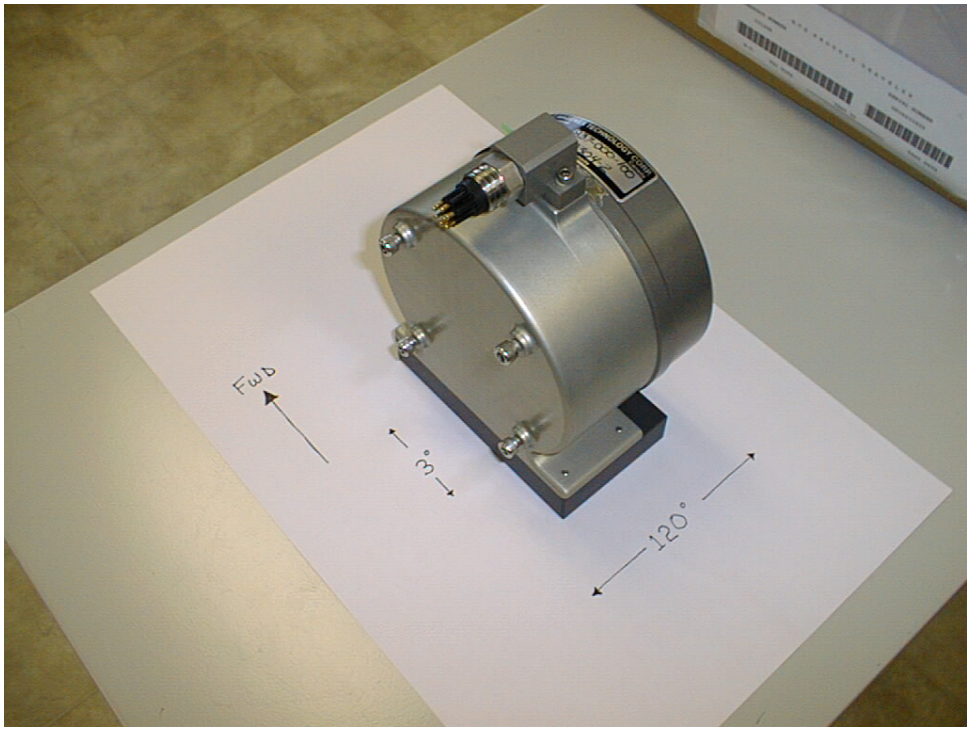

Figure 1. Orientation of sonar head for profiling application. This photo shows the sonar head with the connector pointing to the left or port side. Use the Xdcr Position= Down setting in the menu.

Figure 2. Orientation of sonar head for profiling application. This photo shows the sonar head with the connector on the right side. Use the Xdcr Position= Up setting in the menu.

Surface Computer:

The requirements for the user supplied PC are: Windows XP, an available Ethernet port, and at least 2 GHz Pentium IV processor. Standard software screen resolution is 1024x768. The sonar head needs to run with a static IP (Internet Protocol) address for both head and PC. The IP address of the PC must be set to **192.168.0.X** (X can be any number between 3 and 255). Also set the subnet mask to **255.255.255.0**. These settings can be found in the 'Network Connections' menu under 'Settings' in the 'Start' menu, then click on properties of the LAN adapter, and properties of the TCP/IP. There is also a settings box for default gateway, but it can be left blank. For troubleshooting purposes you may need to know that the sonar head has IP address 192.168.0.2.

Software Installation.

The installation of the software on the PC is straightforward. The executable is called **DeltaT.exe**. It can be installed in it's own directory, and run by double clicking, or you can create a shortcut from the desktop for it. We do not recommend using new program wizard or any other installation program. The program may start up either in playback mode or in real-time mode. If it is in real-time mode and the sonar head is not connected there may be a delay before the prompt comes back. The menu item for selecting between real-time and file playback is called 'Data From…', it is located under the 'File' pull-down menu, which is the leftmost upper pull-down menu item, as shown in the screen capture in *Figure 2*.

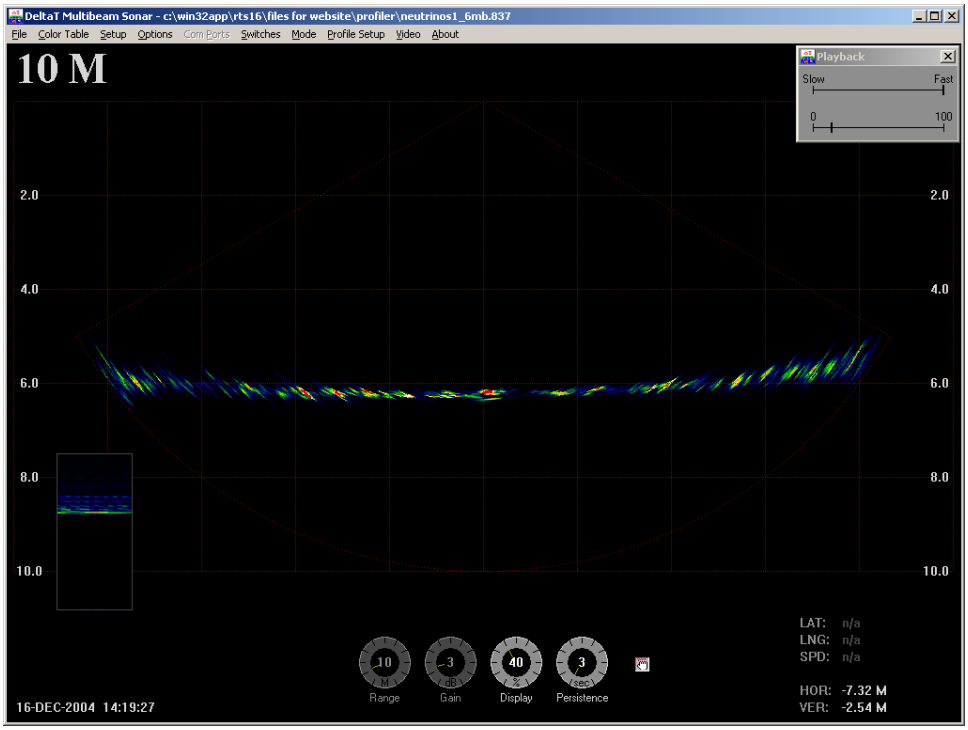

Figure 2. Screen capture from DeltaT program (file playback).

The bottom of the screen contains four rotary dial controls and a hand icon which acts as a Hold (or freeze frame) button. The Range knob controls the current acoustic operating range during real time operation. The Gain knob adjusts the amount of hardware amplification used in the receiver circuitry of the DeltaT sonar head. Adjust the Gain so that there is a minimum amount of Red displayed in the "Signal Level" window located in the lower left-hand corner of the screen. This window is enabled via the Options menu. During file playback the Range and Gain knobs are not active, they simply reflect the setting that was used during the recording of the real time data acquisition. The Display knob is used to adjust the brightness of the sonar image (after the Gain has been adjusted). The Persistence knob adds a decay feature to the sonar image (similar to a radar display). This feature is used for generating a trail behind moving targets. The more persistence used, the longer the trail generated. As long as you are recording the data, you can play back with different display gains, persistence and colors.

Software Settings:

There are nine menus at the top of the screen (see *Figure 2*). The File menu has the Data From… sub-menu to control whether the software is in real-time, or playback. Record Start is for starting data recording (onto the PC's hard drive) and supplies a dialog box for file name and location. Playback supplies a dialog box for selecting a file for playback. (data files are automatically given the extension '.837'). Copy Start is for copying sections of files into a file with a different name, for subdividing long data-files, Save Screen is a screen capture command which creates a .BMP bitmap image of the current screen for inclusion into documents etc.

The Color Table pull-down menu is for changing display colors. Single target detection is often best using the 'NORM HI' color table, while images of the bottom with shadows are usually best

viewed in ‘GREY’ or ‘BROWN-YELLOW’. These colors are for display only, the data can be played back with any color scheme if desired.

The Setup menu contains the Xdcr Position setting (Up or Down), Measurement Units (Meters, Feet or Yards), enable/disable for Automatic filename generation when recording and a Sound Velocity user entry box.

Under Options, there are ‘Grid’ (On or Off), Sector Size (30, 60, 90 or 120 Degrees), Beamwidth (Wide: 3deg, Normal: 1.5 deg, Narrow: 0.75 deg and Narrow Image: 0.75 deg), Beams (120, 240 or 480 display beams), enable/disable Beam Output to IPAddress_Output1 (located in DeltaT.INI) and Averaging (0 to 10 shots). While viewing the data in Sector Mode, ‘Remove Background’ can be used to display only the ‘moving’ targets of a static image. Press the ‘Build Reference’ button to begin generating a background reference image, then press ‘Store Reference’. The background reference image will now be removed from the current image to produce an image with only ‘new’ or moving targets, you can then add Persistence to display a trail behind the moving targets. Other Option menu items include Gain Equalization to normalize the gain across the image, a GPS Lat/Lng Track Plotter window, Signal Level and Diagnostics displays.

To maximize the shot rate when recording to a .837 file, set the number of displayed beams to 120. This will not affect your angular resolution as the number of beams are used only for display purposes. The shot rate (or PRF) can be monitored via the Diagnostics page. This number is displayed in milliseconds (the lower this number is, the faster your update rate will be). When playing back the data file, you can select any number of beams.

‘Com Ports’ is applicable if a GPS is to be connected to the computer as well. GPS positions can be recorded into the data file and viewed in the Track Plotter window in real time (or playback). This information can be used for later mosaicking.

The ‘Mode’ pull down menu controls the different display modes. Again this does NOT affect the stored data so the data can be stored in SECTOR mode and played back in PERSPECTIVE mode if desired. BEAMTEST MODE simply shows the data from the individual channels without processing them into an image. The sonar will operate more quickly in this mode, but you can’t really see what it is looking at.

Enable Profile mode to profile a cross section of the seabed. Profile Point Setup is used for enabling the digitized profile point detection. You can set the Minimum Range and Minimum Level for detection. Enabling the ‘Low Mix’ display type decreases the data level so it is easier to see the profile points. The profile points are output via Ethernet to a connected PC running Imagenex 3Dview.exe using the IP Address stored in “IPAddress_Output1” of the DeltaT.INI file, the points can also be saved to a separate profile point data file (.83P) via the ‘Record To Profile Point File...’ button. This operation can be performed in real time or during file playback.

While viewing the data in Profile Mode, ‘Profile Waterfall’ can be used to display consecutive cross-sections of the sea floor in a depth vs. color window. To change the depth to color ratio, position the cursor over the small profile image at the left side of the display and left-click to change the start depth then right-click to change the span.

The ‘Video’ pull down menu is used for displaying a video window from an optional video capture device such as a video camera plugged into a USB video converter (i.e. Adaptec AVC-1100 USB). Sub-menus include ‘Open Video Window’, Change Video Format’, ‘Record Enable’, and ‘Video Recording Rate’

The final pull-down currently just contains the software version number. Help is available from this document or by phoning us at 604 944 8248 between the hours of 9:00- 5:00 PST.

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