Sound Metrics

Additional Software Features

Fisheries Applications

•Auto-Counting Auto-Sizing Direction-of-Passage
DIDSON software has the capability of counting, sizing, and determining the direction of travel of fish swimming in rivers, even shallow rivers, with rocky, uneven bottoms.

•Fish Behavior and Status of Underwater Structures
DIDSON's high resolution images provide almost video quality images in dark and turbid water where optical systems are ineffective. This allows monitoring with high precision, fish behavior or status of structures in environments where such monitoring could not be done before. Three example applications are: (1) Fish behavior at entrances such as fish ladders or trawl nets, (2) Spawning salmon in turbid water or at night, and (3) Inspection of trash racks.

•Background Subtraction
Removes static background to allow detection and counting of fish swimming over rocky, uneven bottoms. DIDSON has been used in shallow rocky-bottom rivers where hydro-acoustic surveys with conventional fish counters were not possible.

•Motion Detection
Enhances the ability to auto-detect and auto-size objects moving within the sonar's field-of-view.

•Mark Fish
A manual way of marking fish with mouse clicks as their images pass on the screen.

•Transmission Loss
Balances the brightness of the display by scaling returns to compensate for acoustic spreading and absorption as a function of range from DIDSON

•Log Cursor Track
Allows the user to follow a fish image with the mouse. The track is entered in a file in range and bearing coordinates.

•Echogram
The echogram marks fish passing through the center beam and plots the mark as a function of range from sonar versus time of passage. It provides an overview of where fish images are in the file. The software also automatically analyzes each mark and measures the size, range, direction, and time of passage of fish associated with each echogram mark. It also makes a text file listing this information. The DIDSON echogram is different from traditional echograms because it is interactive. When the user clicks on an echogram mark, the software plays a "video" snippet of the fish that caused the mark. This allows the user to verify what the mark indicates and answer other questions that cannot be answered by looking at the echogram alone.

•Find Rare Events
A number of customers need to count fish in a small run over a period of many weeks. DIDSON has two ways to help in this task.
(1) *Selective Recording* – The user establishes a threshold and other parameters such that DIDSON records a frame only when those criteria are met. For example, the user would turn on background subtraction and motion enhancement. DIDSON removes the static returns (rocks, weirs, etc.) from the image. When a fish passes, the dark screen lights up with a cluster of pixels representing the passing fish. DIDSON counts the lighted pixels in each frame. When the count exceeds a user-set threshold, that frame is recorded. Files recorded continuously for one hour at 7 frames/s would have 25,200 frames to monitor. Files recorded by Selective Recording over one hour would have only a few 10s or 100s of frames and each frame would have something of interest in it.

(2) *Selective Viewing* – A more conservative way would be to record every frame. That way if a rare fish passed that would not trigger the selective recording above, it still would be recorded. Selective viewing greatly speeds counting rare fish. The user sets criteria as in Selective Recording above, then processes the original continuously recorded file. A second, much shorter file is made with index markers placed at each "passing occurrence". The user can make additional files using different parameter values and see how the "passing occurrences" change. This second way speeds up the viewing (counting) process but retains the original "record everything" files so one can go back and analyze them again with different parameters.

Autonomous Sampled Recording

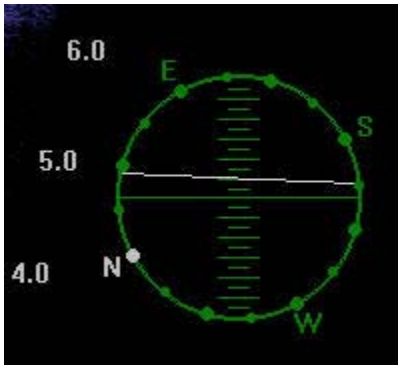
DIDSON has a Timer option that allows you to record a set of selected intervals on an hourly basis, daily basis, or just once. The Timer setting also specifies the sonar state such as min and max ranges, sonar frequency, frame rate, and gain settings. For example, sampled recording would allow you to record 15 minutes at the top of each hour at high frequency covering a range out to 15 meters and another 15-minute recording at low frequency with max range out to 25 meters. The sonar will change its settings then start and stop recording autonomously.

Voice Annotation

Version 5.00.06 and greater allows one to make audio recordings along with DIDSON images. The audio annotation can be made during live recording or to an existing DDF (DIDSON data file) during playback. This feature was requested by ROV operators in the Oil&Gas fields. They use DIDSON as the primary sensor in turbid conditions and when they fly over points of interest, they wanted to easily record comments for their client or supervisor.

Orientation

A Honeywell TruePoint Compass when placed in the Diver-Held or Unibody housing provides roll, pitch, and yaw (compass) in degrees with a stated accuracy of 1 degree rms. DIDSON presents the data both as numbers printed on the display and as a graphic shown below.



The heading of the sonar is marked by the direction shown at the top of the circle. When heading changes, the circle rotates. The white line marks the horizon. When the sonar tilts downward, the white line rises. When the sonar rolls counter-clockwise, the line rotates clockwise.

The orientation numbers are recorded in the DDF file. The graphic and numbers will be shown on the display when the file is replayed.