



Vertical Visualization of Structures

Unlike its side-scan sonar counterpart that must be towed to generate a record, scanning sonar can be positioned in any orientation to scan an underwater structure. Images like those below, collected using the MS 1000 software and a 675 kHz frequency High-Resolution Scanning Sonar Head, reveal detail that can not be obtained with any other imaging tool – especially in the near zero visibility conditions of the two lower right mosaics. A fan beam coverage transducer was used to obtain all three.

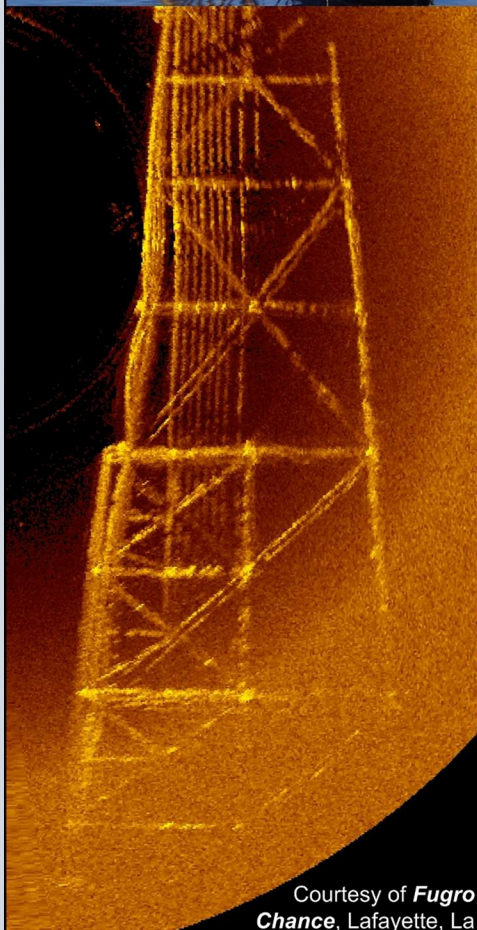
The key to vertical visualization success is in the alignment of the sonar head which is illustrated on the back page of this application note. The orientation is different for the oil platform record than that used to collect the seawall and bridge pier scans.

The oil platform image is a *single scan* taken at 100m (328') range with the head mounted horizontally on an ROV and positioned approximately 25m (82') from the structure. The beam was oriented with its wide axis horizontal in the water column *facing the platform*.

The dock and pier data sets comprise multiple scans taken at different positions along the structures. Off-the-shelf software was used to combine and mosaic individual sonar scans and add the above water photograph to show both surface and underwater perspectives. To obtain this data the *body of the sonar head* was aligned normal (90°) to the structure with the transducer positioned approximately 1.2m (3.9') from its face.



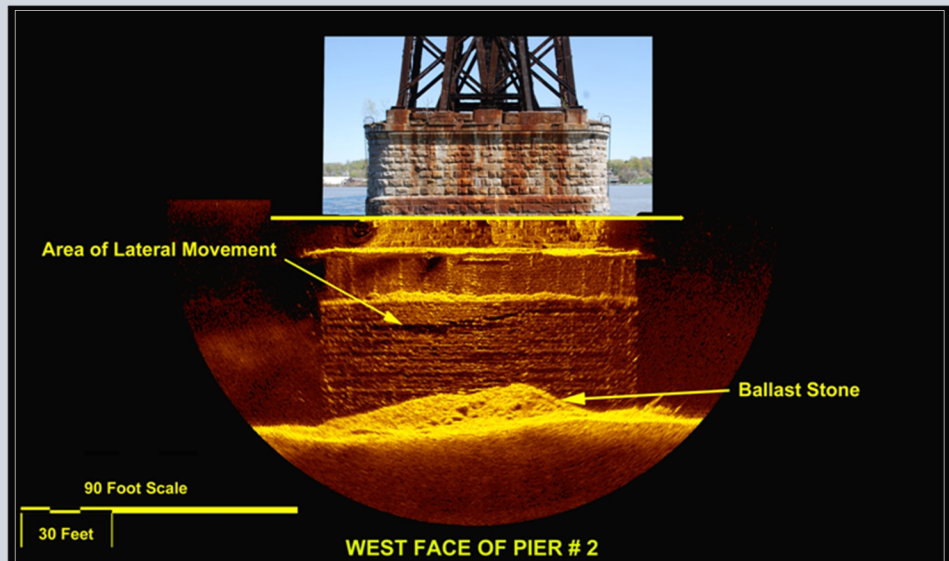
NOTE: CENTER LEGS DO NOT GO TO THE BOTTOM. THEY END APPROX 100' UNDER SURFACE.



Courtesy of *Fugro Chance*, Lafayette, La



Courtesy *Abbott Underwater Acoustics*



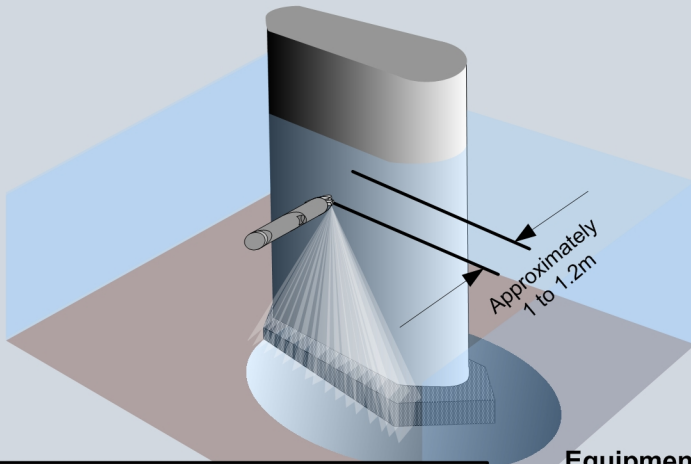
Courtesy *Abbott Underwater Acoustics*

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Scanning Sonar Head Alignment for Vertical Visualization

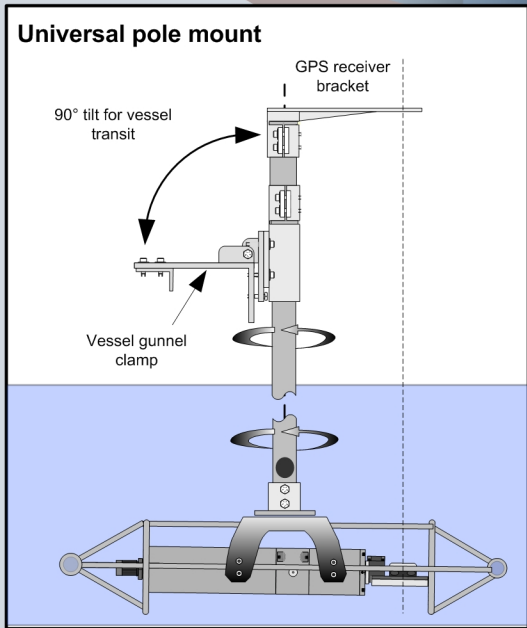
KONGSBERG



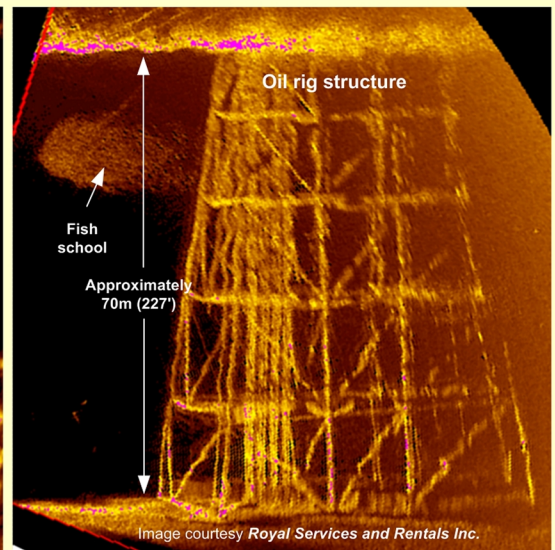
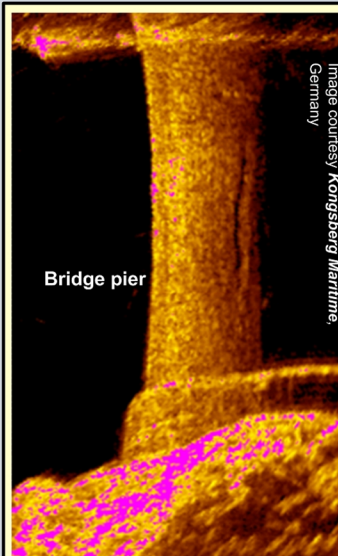
When scanning a piling or seawall the head is oriented as shown in the upper left illustration. To obtain the best possible image the sonar needs to be stable with the transducer positioned approximately 1-1.2m (3.3'- 3.9') from the face of the structure. The universal pole mount shown works well in relatively calm water when the support vessel can be held in position against the structure. In rougher water, consider deploying the sonar using a deployment arrangement that *attaches to the structure* and decouples the boat movement.

Equipment configuration for vertical visualization of structures:

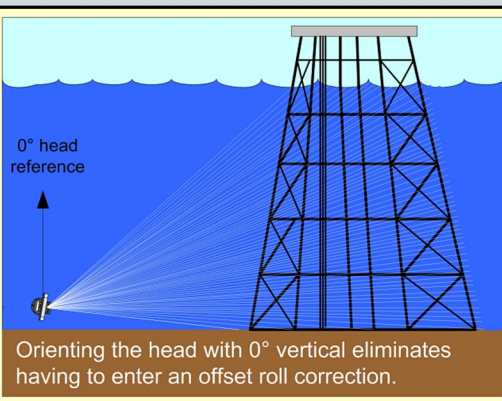
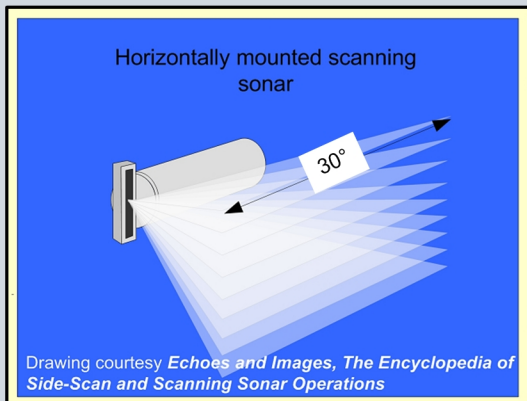
- Laptop computer with MS 1000 PC-based Sonar Software
- MS 1000 Interface Unit
- Kevlar deployment cable
- 675 kHz High Resolution Scanning Sonar Head with fan beam transducer (or Multi Frequency High Resolution Sonar Head)
- Tripod
- Sonar Pole Mount



The Kongsberg Mesotech universal pole mount option attaches to the gunnel of the support vessel. It is designed to horizontally deploy the high resolution scanning sonar head to a depth of 3 metres/9.8' (dependent on vessel freeboard). The pole rotates and can be tilted up during vessel transit; the GPS bracket positions the receiver directly above the transducer.



Using a fan beam with the head mounted horizontally allows the operator to image vertical structures. The key to this application is ensuring the sonar head is level, stable, and aimed at the structure.



The same deployment and orientation used to image the platform may be used to observe water column target and to track the vertical position of crane loads being lowered to the seabed.

Mounting the head on a pan unit provides 360° of coverage.