

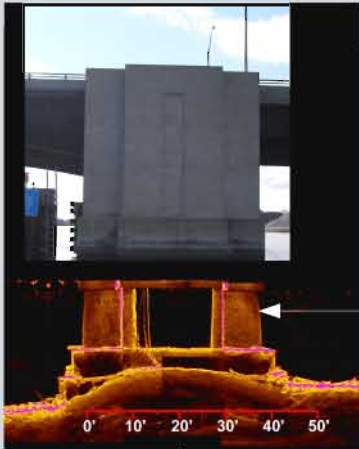


Bridge Visualization

Upstream Bull Nose



Downstream Bull Nose



Acoustic distortion on both underwater sides of the pier is due to the close proximity of the sonar head to the structure



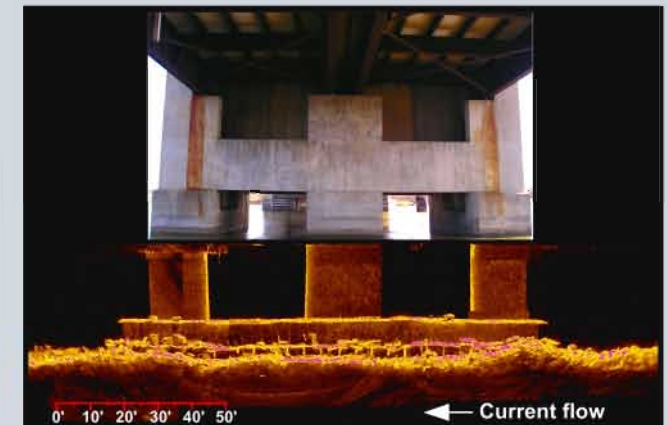
Pier 4 Independence Bridge, Bay City, Michigan



Main Channel View



North View



Sonar images created using a Kongsberg Mesotech High Resolution Scanning Sonar Head with a 0.9° X 30° beam; the sonar head was both tripod and pole mounted to achieve the riverbed and vertical scans.



Typical tripod MS 1000 Scanning sonar System with the High Resolution Sonar Head and Kevlar deployment cable



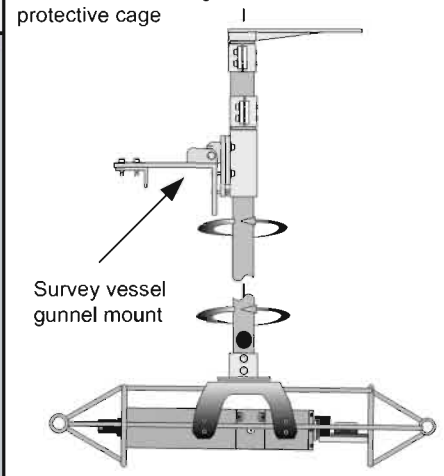
Equipment configuration for riverbed and vertical visualization of structures:

- 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

Additional equipment considerations:

- Surveyors tape
- Marker
- Daylight-viewable second monitor
- ½" high quality rope (several 100' lengths) to wrap around the pier if needed
- DGPS
- 15 pound lead weights (3)

Horizontally mounted High Resolution Scanning Sonar in protective cage



Scanning Sonar Pole Mount

Additional information:

- For vertical visualization of the sub-structural elements the sonar transducer is typically positioned 3'-4' away; **the body of the sonar head needs to be normal to the plane being imaged.**
- Record a waterline elevation measurement at each scan location the sonar data can be referenced to a local vertical datum level.

To scan a vertical structure the sonar head is mounted horizontal and is typically positioned 3' - 5' (1- 1.6m) below the water surface.

