



## Under-ice Body Search and Recovery

Using scanning sonar for under-ice search and recovery incidents offers significant advantages over open water operations. The ice platform allows the operator to create a precise grid from which to deploy the head and determine sonar coverage. The thickness of the ice (and weather conditions) determines the type of surface enclosure that may be used to operate the MS 1000 computer/processor and Interface Unit. In this incident, an ice thickness of 60cm (24") allowed the team to utilize a van. Alternative shelters include an ice fishing hut or a tent that can be moved from one location to the next.



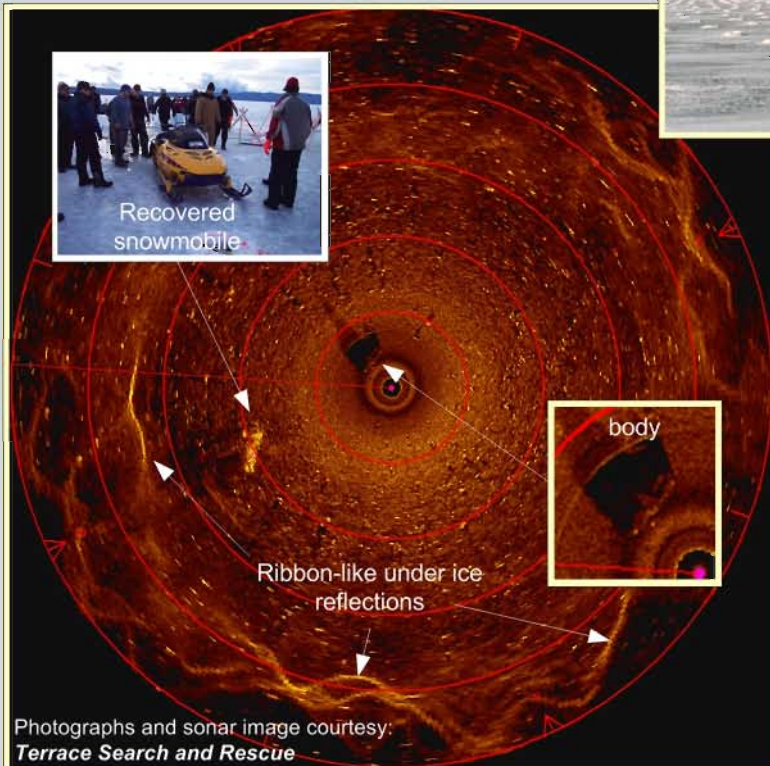
Sonar deployed using a rope secured to the head with hose clamps

Keep the head warm between sonar deployments, and ensure ice does not build up between the transducer and body of the sonar head as this may prevent transducer rotation.

Although it is recommended to keep the sonar head in a protective cage, if needed, it can be rigged as shown (left image). Carefully lower the head to the bottom and raise up 1m (39"); let the head stabilize before completing the scan.



Grid of deployment holes drilled into the ice



Recovered snowmobile

body

Ribbon-like under ice reflections

To speed up the search, use a team to drill the deployment holes ahead of the sonar crew.

Sonar range selection is determined by bottom conditions, water depth, and the reflectivity of the underside of the ice. In the program shown, ribbon-like reflections of the ice limited the coverage to 20m (66") range (water depth varied between 2-5m (6.6'-18' metres).

For this search, a drop camera was used to classify all high potential targets observed on the sonar screen.

During search operations always keep detailed notes of deployment location, recorded data file names, and target descriptions.



### Sonar equipment configuration for under-ice search:

- Computer with MS 1000 PC-based Sonar Software
- "Splashproof" MS 1000 Interface Unit
- Kevlar operations cable (75m-100m [250'-330'] recommended)
- 675 kHz High Resolution Scanning Sonar Head with fan beam transducer (or Multi Frequency High Resolution Sonar Head)
- Tripod Deployment cage
- Remote Keypad/Hand-controller

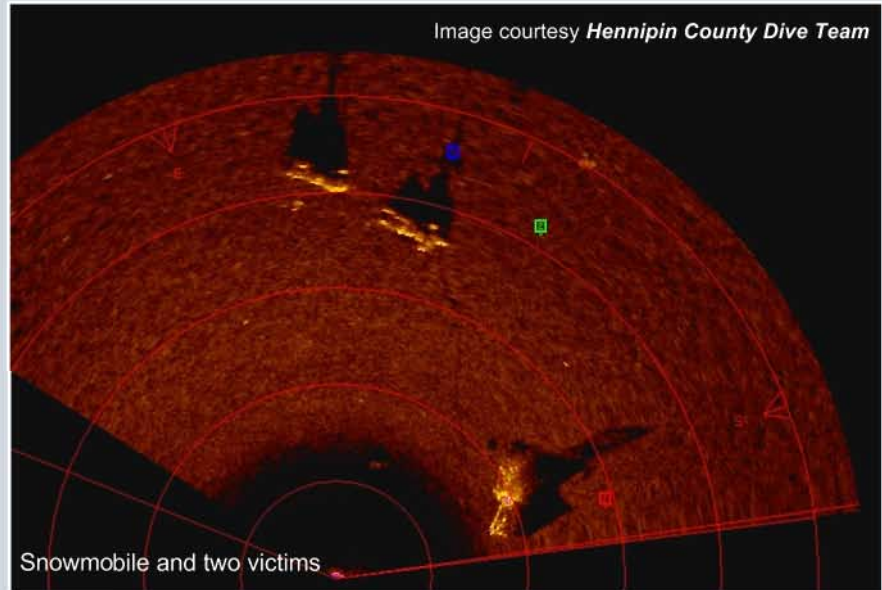
### Additional equipment considerations:

- Shelter (that can be easily moved)
- Generator with ground lead
- Ice auger
- Heaters
- Second monitor
- GPS



Winnipeg Police officer deploying the cage-mounted sonar head into an augered hole at -26°C (-15°F).

Operating from a skid-mounted ice fishing tent allowed the team to move the tent with a snowmobile.



Winnipeg Police officer shown operating the sonar in relative comfort inside the tent despite outside sub-zero temperatures.

### Notes:

Search operations are dynamic and a second monitor allows another set of eyes on the sonar image. Data interpretation is easy when the bottom is flat and featureless; when trees, logs and other debris are observed in the record, identifying a body-like target is more challenging.

Create a scaled plot sheet that shows the drop locations. Number each location with a unique identifier and use the same to name the file when the sonar data is recorded at each drop.