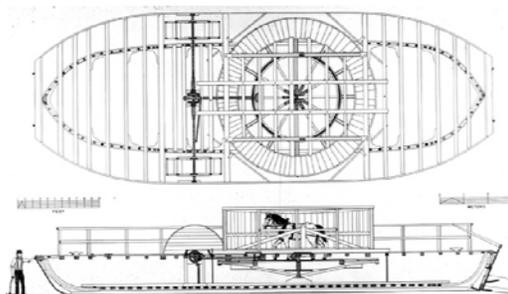




Wreck of The Burlington Horse Ferry Lake Champlain, VT (circa 1820~1850)

A little known means of transportation in the middle of the 19th century was the horse ferry. Horse-powered ferries, or horse team boats were active in Ohio, Wisconsin, Nova Scotia, New York, on the Mississippi River, New Hampshire and Vermont¹. In 1983, the wreck of a horse-powered ferryboat was discovered in Burlington Bay.



The first "team-boat" was actually used in New York City around 1815. Initially these vessels had horses that walked in circles, thereby turning a central post. In 1819, Barnabas Langdon invented a horse ferry that made use of the treadmill concept, where the horses walked in place while the tread-wheel under their hooves rotated, in turn rotating a paddlewheel.

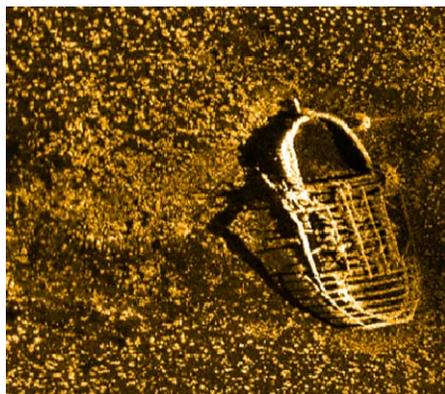
The Burlington Horse Ferry is of this type.

These vessels were well-suited for short passages and were a reliable service that was relatively independent of wind and current, compared to sailboats and rowboats. They were also free of the explosions that sometimes occurred on steamboats. From about 1820 to 1850, there were approximately five horse ferry crossings on Lake Champlain.

The Burlington Horse Ferry was 63ft long and 23ft wide, powered by two horses, was probably capable of carrying 40 passengers. It is believed that the ferry was undocked during a storm and subsequently was crushed by the ice in the bay.

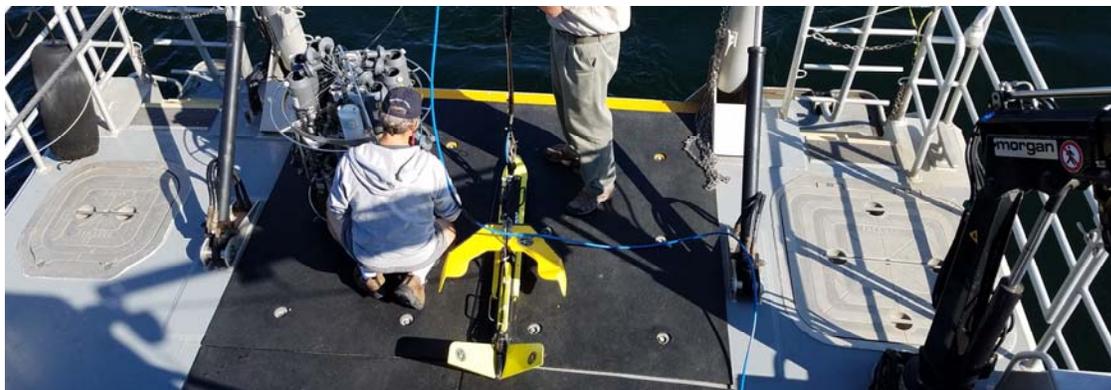
We imaged the Burlington Horse Ferry in September, 2016 with our Klein S4900 Side Scan Sonar² onboard the *R/V David Folger*, with the assistance of Dr. Tom Manley of Middlebury College.

The wreck lies in 50ft of water, less than 1/2 mile off the Lake Champlain coast in Burlington, Vermont.

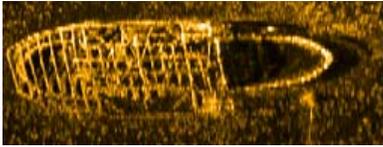


Klein System 4900 at a glance

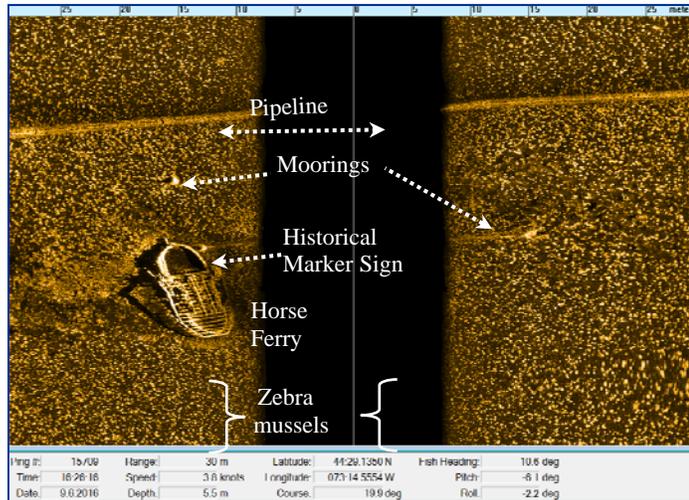
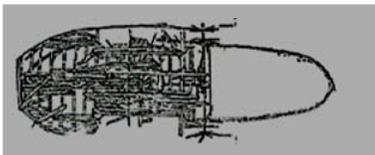
- Dual, Simultaneous Frequencies
- CHIRP and CW Modes of Operation
- Depth Rated to 300 m
- Optional Magnetometer and Responder
- Search and Recovery, UXO, Inland Water, Dredge, Hydrographic & BOEM Surveys, Port and Harbor Security, Archaeological/Treasure/Wreck Hunting, Hull Surveys



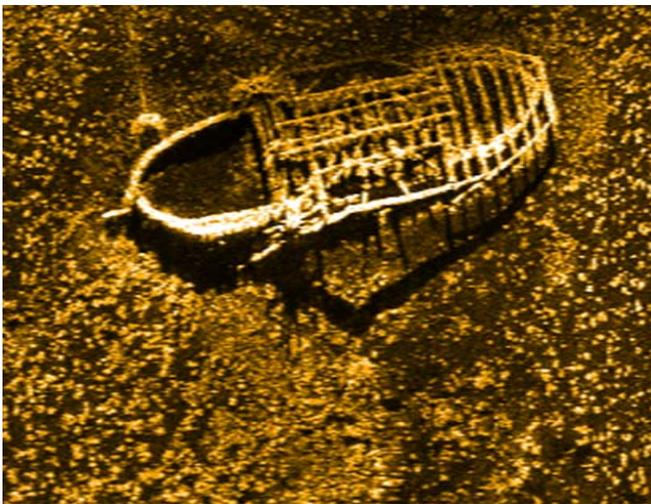
The Surveyor Notebook



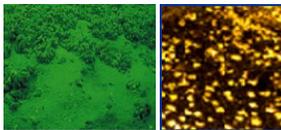
Klein 4900 sonar image from scanning 100m swath, at 4 knots speed is shown above. For comparison, below, is a tracing completed by Crisman³, based on a ~75 photograph mosaic developed by SCUBA divers prior to the archaeological excavation in 1993. It appears very little has changed in more than 23 years, aside from the convenience of the 4900 sonar imaging technology. Bow is pointing left, in these images.



The above image shows high frequency side scan sonar (4900) view in Klein SonarPro[®] software, scanning a 60m swath, at 4 knots speed, passing Burlington Bay Horse Ferry (port side). Based on the acoustic shadowing, it's clear the starboard side is elevated. Adjacent to the wreck, a historical marker sign for SCUBA divers is visible. Other features include mooring blocks, pipeline, and invasive zebra mussels.



In the Klein 4900 sonar image shown to left, notice the rudder extending from the stern, fine silt deposits inside the stern cavity, where the upper deck is missing, followed by the horizontal axle, remains of paddlewheel hubs and their decaying spokes (notice the fine detail from the spokes cast in the acoustic shadow below). Immediately forward of the axle, below the framework for the upper deck, the concentric rings of the round turntable and spokes are clearly visible, along with gaps in the upper deck for the horsepower conveyance. The starboard side upper deck framework is clearly disengaged in the mid-ship, and partially buried in the clay lake floor, on the port side.



The invasive zebra mussel (*Dreissena polymorpha*) blankets the bottom of Lake Champlain, as shown in the Klein 4900 side scan backscatter (images to left and above). The photograph⁴ image to far left is an example of lake bottom coverage by the invasive species.

For this survey we towed the Klein S4900 side scan sonar², fitted with a K-Wing I depressor, using a light-weight Kevlar-reinforced coaxial cable, through the A-frame of the *R/V David Folger*, planned, acquired and reviewed survey data using SonarPro[®] V14.1 survey and targeting software.



- 1) https://en.wikipedia.org/wiki/Burlington_Bay_Horse_Ferry
- 2) <http://kleinmarinesystems.com/>
- 3) <https://www.burlingtonvt.gov/sites/default/files/PZ/Historic/National-Register-PDFs/BurlingtonBayHorseFerry.pdf>
- 4) <http://www.nature.com/nature/journal/v393/n6680/full/393027a0.html>

