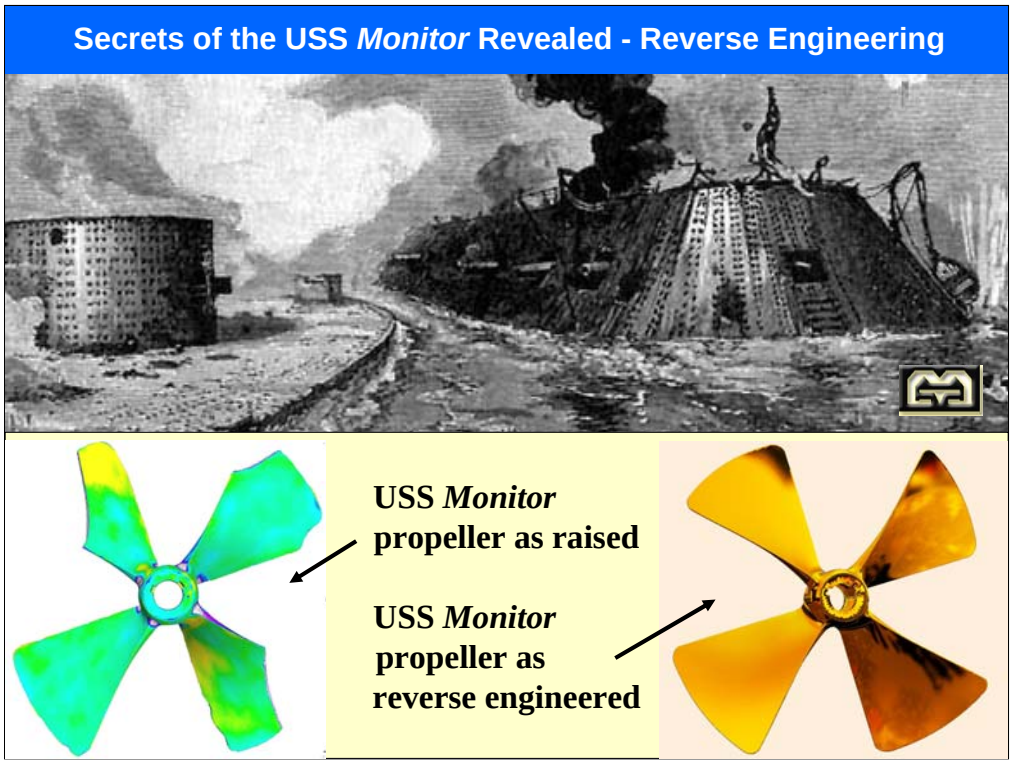

Most drawings and calculations of the design of the USS *Monitor* were deliberately destroyed by its designer John Ericsson who reasoned "…to prevent posterity from supposing that my knowledge was as imperfect as said relics would indicate." But not to disturb the genius from his grave, MAGLEV, Inc. engineers have delved into the designer's secrets by accurately reverse engineering the recently raised but severely deteriorated ship's propeller. Data were processed to generate a full scale 3D model revealing the dimensions and contours of the inventor's designs. The data showed the remarkable level of manufacturing sophistication of the industrial capacity of Civil War era America.

Using coherent laser radar metrology and structured light technology, combined with a sophisticated solid modeling software, MAGLEV, Inc. engineers worked together with The Mariner's Museum at Newport News, Virginia to assist in the documentation and conservation of the *Monitor's* propeller. The non contact laser scanning process safeguarded the fragile relic from both exposure and contact during the measurement process. The results are a very accurate solid model that can be measured and analyzed in various ways. One finding was based on rotating the four bladed propeller and comparing each blade surface and contour to the next. The results showed a less that one-eighth inch difference over most all blade surfaces of this 9-foot diameter propeller. Another use of the measurement data was to create a complete 3D model using the data from one blade to "fill in" missing data of other blades. This created a complete "as designed" model that was used for hydro-analysis to allow engineers to determine the actual speed and power of the ship.

Reverse engineering processes allow exact as-built dimensions of an object to be developed from analysis of the old component. The process is very useful for many U.S. Navy components as well as other defense and industry components. The technology utilized in determining the as-built conditions of the *Monitor's* propeller was developed in part as spin off technology from the work the MAGLEV, Inc. has been performing for the U.S. Navy on precision fabrication of large curved steel components.