



## Background:

The Applied Research Laboratory of a leading university was contracted by the Naval Surface Warfare Center (NSWC) Carderock Division, to develop a low noise, water cooled electric motor for a subsurface naval propulsion test system that would only operate in a confined, airless environment. The new motor was required to achieve performance characteristics of a 400HP / 600 volt motor in a small, non-traditional package.

The Laboratory contracted with a small manufacturer, and after 12+ months of continuous development and testing, the new motor did not meet the performance profile demanded by the Navy.

Convinced the manufacturer would never overcome its challenges – and refusing to invest more time, money and effort to try to fix its flaws – the Laboratory utilized its Navy resources to seek alternate manufacturer options, and was recommended to contact Ward Leonard.

## Challenge:

Develop a water cooled 400HP / 600 volt motor that will continuously operate within a confined, unventilated, 19" diameter sealed environment.

## Solution:

Ward Leonard's electrical and mechanical engineers approached this challenge from a 360° perspective, and applied their cross-industry experience developing compact, high horsepower motors for Oil & Gas drilling rigs, and leveraged the capabilities of high performance computing, finite element analysis (FEA) and computational fluid dynamics (CFD).

The result was a low acoustic signature, smoother torque motor with a unique intra-stator liquid cooling jacket design that fit dimensional constraints and exceeded performance requirements.

*For over 115 years, Ward Leonard has partnered with the Department of Defense to produce innovative motor and control solutions that meet the toughest mil-spec requirements. For more information or to speak with one of our engineers, visit us at [www.wardleonard.com](http://www.wardleonard.com).*

# Reimagining Motors for Subsurface Propulsion Systems

Cross-Industry  
Experience Delivers  
Higher Horsepower  
in a Smaller  
Package



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Excellence in Motor and Control Solutions