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Developing the 21st Century Marine Technician—*Hans Van Sumeren*

Hans Van Sumeren is the director of the Great Lakes Water Studies at Northwestern Michigan College. He has been active for the past 20 years in ocean and Great Lakes education, outreach and research, including environmental monitoring, hydrographic mapping and ROV use in scientific exploration, shipwreck investigation and search and rescue operations.

The combination of rapid technical change and technology use with the decline in qualified technicians sets the stage for fresh approaches to technical training. Meeting the challenges of preparing a globally competent workforce mandates a retooling of both the delivery method and the skillset required to be successful and adaptable to change. Traditionally, this training has occurred through industry-specific courses or, more conventionally, through scattered degree programs at universities and colleges across the globe. Substantial investments are made by industry each year to meet internal workforce demand. However, in areas of rapid growth, the strategy of in-house training can no longer keep up with demand, or the quality of training suffers. Meanwhile, colleges cannot fill this gap without new delivery methods for trained professionals and strong partnerships and connections with industry.

Located on the shores of Lake Michigan, Northwestern Michigan College (NMC) has shown the benefits of bridging academics with industry in the marine space. NMC has a long history of water-related training and academic offerings, including the founding of the Great Lakes Water Studies Institute (2003) and Great Lakes Maritime Academy (1967). In 2009, NMC pioneered the first associate's degree in freshwater studies and in 2013 launched an engineering technology degree with an emphasis in marine technology and unmanned systems. Pending a final accreditation review, NMC proposes to offer a bachelor's of science (B.S.) in Maritime Technology in 2014, the first B.S. at a community college in Michigan.

In 2009, Kongsberg Underwater Technology Inc. (Lynnwood, Washington), C & C Technologies (Lafayette, Louisiana) and HYPACK Inc. (Middletown, Connecticut) supported NMC with the no-cost lease of a sonar system, positioning system and data collection software for use in a pilot program for hydrographic survey training. These innovative relationships have led to a robust set of technical training courses, professional development opportunities, research opportunities and university partnerships.

Students gain employment opportunities because of the specific competencies acquired during hands-on training exercises with systems such as multibeam echosounders, scanning sonar platforms, side scan sonar, sound velocity profilers and advanced positioning systems used in offshore applications. Industry partners benefit from the exposure of their equipment in the training programs and the increased pool of highly qualified, technically trained professionals. This smart sponsorship benefits the marketplace through a raised level of talent across the industry.

With a priority of student success, NMC has made significant investment to support these programs with people, equipment and infrastructure. The Great Lakes Campus at NMC is home to a college-owned harbor and several boats and ships used for training, including the 224-foot TS *State of Michigan*, the 56-foot RV *Northwestern*, a 41-foot U.S. Coast Guard utility boat, a tug boat and a small open cockpit runabout. Access to deep water from the classroom or lab is less than 10 minutes by vessel. In addition, NMC operates and maintains monitoring buoys moored in Grand Traverse Bay, transmitting oceanographic and meteorological information during the navigation season for public use. Marine Technology and Freshwater Studies program students deploy, retrieve and troubleshoot these systems.

In support of subsurface position and data analysis, NMC is also home to an ultrashort baseline acoustic tracking system and HYPACK/HYSWEEP navigation and processing software. An observation-class ROV with manipulator and scanning sonar supports subsurface investigations, including of the numerous shipwrecks located in the Great Lakes (many of which were first discovered by students in the program during multibeam survey operations over the past five years). Opportunities for exploring the depths of Lake Michigan include ecosystem and habitat investigations, along with unique geological features that were glacially carved 10,000 years ago during the formation of the Great Lakes and, correspondingly, the end of the last Ice Age.

Most recently, NMC has created the Unmanned Systems and Robotics Center (USRC) that combines expertise in the air, land and marine environments. It is home to unmanned robotic platforms, along with the technology and systems to support work in the marine environment. USRC provides students of all backgrounds the opportunity to gain competencies highly relevant to the commercial, government and private sectors. The center is strategically aligned with industry to provide multiple career workforce opportunities in emerging and existing markets.

USRC embodies a new, interdisciplinary approach to technician training that provides a set of core competencies common to 21st-century technicians, delivered in a time frame that meets the demands of tomorrow's industry. For example, some options prepare a student with industry-specific training in 15 weeks. An advisory board committee has been established to ensure the content and timeliness of the curriculum remains cutting edge.

NMC offers an example of how academics and industry can partner for the benefit of both students and the private sector. Other schools who also use industry support to advance student opportunities include the University of New Hampshire Center for Coastal and Ocean Mapping and the University of Washington; Kongsberg Underwater Technology works with these two institutions as well.

The programs available to students are responsive to the technical needs of the marine industry, while also creating new pathways for students to build successful careers. ■