The State Committee for Research honors Alaska's

Northern Innovators

Seth Danielson

Northern Innovators Hall of Fame Member

Dr. Seth Danielson played essential early roles in the conceptualization and development of the Remote Power Module (RPM) – part of the 2014-2015 class of the State Committee for Research Innovators Hall of Fame.*

The remote power module (RPM) is a device collaboratively designed, built, and tested by University of Alaska Fairbanks (UAF) Professor Emeritus Thomas Weingartner, Danielson, and a technical team led by university research analyst Hank Statscewich. It is now routinely used to power high frequency radars that map ocean currents from shore. The RPMs are autonomous power generation units that are deployed in remote regions, typically without road and vehicle access (aside from snowmachines, skiffs, or 4-wheelers). The RPM generates electricity from wind and solar energy and also transmits system health engineering data and radar data to research labs for use in real-time applications via satellite communications. Dr. Danielson's contributions to the RPM included conceptual and system-level design and guidance on renewable energy devices and configurations for these devices. His advice was based in part on his background in electrical engineering, his role in supporting generator-powered remote field camps, and his extensive experience with producing and monitoring renewable energy as part of his off-grid hybrid-power residence near Fairbanks. Upon Professor Emeritus Weingartner's retirement from UAF in 2017, Dr. Danielson assumed faculty oversight of the RPM-radar systems.

The RPM has been an outstanding success. Building on experience with powering high frequency radar systems in Prince William Sound in 2004, the RPM started with an initial prototype in 2010. The network has since expanded to as many as four operating simultaneously in Arctic Alaska over the past decade. The RPMs were initially funded by the Department of Homeland Security and eventually by the oil industry, the Department of the Interior's Bureau of Ocean Energy Management, and the Alaska Ocean Observing System (AOOS). Subsequent to the Arctic installations the National Science Foundation supported UAF to build and operate two RPM and high frequency radar systems in Antarctica (again with much success) and those systems will be redeployed in 2020. In addition, AOOS is supporting the 2019 construction of another RPM that will be used to bring high frequency radar current mapping to the Bering Strait region.

Data from the high frequency radar-RPM systems are used to guide marine search and rescue operations, oceanographic research, hazardous materials spill response, water quality monitoring, and marine navigation. The data contribute to climate change research, a better understanding of fisheries and ecosystem dynamics, and more efficient and safe maritime operations. The RPM also contributes to the monitoring of offshore and coastal vessel traffic by supporting marine Automatic Identification System (AIS) antenna and data transmission.

Dr. Seth Danielson is currently an Associate Professor of Oceanography with the UAF Institute of Marine Science (IMS) in the College of Fisheries and Ocean Sciences. He has worked for IMS since 1993.

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