Beaufort Gyre Exploration Project: Dispatch 21: 27,000 Horses of Ice Breaking Power

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Location: 71° 22’ N 152° 06’ W

Weather: -1°C (30°F), Partly cloudy, seas moderately choppy, Southeast winds at 7 knots, seawater temperature 2°C (36°F)

Sea Ice: Patchy for a brief period, but otherwise none

In Montana, I drive a Subaru Outback (as does half the state) and it comes with 170 horses under the hood. Plenty of power to travel around the state even in the middle of winter (snow tires and all-wheel drive don’t hurt either). It would take about 160 Outbacks to match the power of the CCGS Louis S. St-Laurent. She comes equipped with five diesel engines that power three 9,000 horsepower propulsion motors. This transfer of power involves a few steps. First, the diesel engines drive AC generators. That electricity is then sent to the propulsion motors, whose role it is to turn the shafts that carry the ship’s three propellers. Inside the propulsion motors are cycloconverters that make the necessary conversion from AC to DC power, which the rest of the propulsion motor can then use to drive the ship.

Steering the CCGS Louis S. St-Laurent’s is no easy task either. The ship has a massive hydraulic steering system that moves a 20-ton rudder, giving the ship maneuverability and steering power even in sea ice. The quartermaster’s steering inputs becomes an electric signal that travels to the rear of the ship, where it is converted into mechanical movement of the massive rudder.

Nick England, Senior Engineer, shared all this information with me on a tour of the engine room. Having spent most of my time on the bridge and with the science team, it was fascinating to see a whole different side of the ship. The engineering department is responsible for many functions that people might not think about. They produce all of the drinking water onboard through a process called desalination, making around 15,000 liters of water a day. They also handle all the wastewater for the ship and maintain compressors that help start the engines and also provide a supply of compressed air for the rest of the ship. The engines, obviously, need to be kept cool like your car engine, so they monitor a large seawater-based cooling system that uses cold Arctic water as a heat exchanger to keep the engines operational even under heavy ice loads. Finally, they help provide water and power to all the science laboratories onboard.

The engineering department really is the heart of the ship. Often working in different areas than the rest of the crew, it can be easy to forget they are there. Their work, however, is critical to both the operation of the vessel itself and the science mission.