



**World Leader  
in Fuel Flow Computers**

**Case Study**



Photo Courtesy of Reny B. Tyson

## R/V Point Sur

FloScan Reduces Fuel Consumption and Lessens Environmental Impact

**Fuel costs are the single largest recurring expense** involved in operating a commercial vessel and FloScan is dedicated to providing advanced Fuel Flow Computers that maximize vessel fuel efficiency. This case study details the benefits experienced by installing a FloScan system on the Research Vessel Point Sur which include a 6% improvement in fuel economy. And with accurate fuel-use forecasting, the Chief Engineer has the data which allows him to purchase the precise amount of fuel at the best possible price to make their next port-of-call.

### Introduction:

FloScan Fuel Computers have been chosen by operators of a wide range of commercial vessels to assist in reducing operating costs through the monitoring of real-time fuel consumption and by tracking vessel operational data to maintain peak levels of efficiency. FloScan has over 40 years of experience in fuel monitoring systems for marine, civil aviation and industrial generator use and offers vessel operators the most accurate and dependable systems on the water today. Combined with an array of networking and data logging peripherals, FloScan provides the captain and chief engineer with instantaneous and continuous fuel consumption data.

The information provided by a FloScan system is the critical link in fine tuning engine, hull and propeller settings to assure the vessel is operating at peak efficiency. It also serves as an early warning system for potential mechanical problems and can further reduce fuel costs by accurately logging fuel burn for use in planning refueling stops in ports offering the most advantageous prices.

As part of our continuing commitment to the maritime industry, FloScan will publish case studies of specific installations on a variety of

craft that detail the vessel's specifications, operational parameters, type of FloScan equipment in use and the experience of the captain and/or chief engineer with the system.

### Point Sur Overview:

The Point Sur is a 135' research vessel owned by the National Science Foundation and operated by Moss Landing Marine Laboratories in Monterey Bay, California. Although small for a research vessel, she makes up for her lack in size with her versatility, reliability and a determined crew. The Point Sur primarily operates off the West Coast of the United States as a regional-class vessel in the UNOLS (University-National Oceanographic Laboratory System) fleet. Outfitted with three scientific winches, two deployment frames and two cranes, she can accomplish almost any oceanographic mission. She carries up to 11 scientists with an endurance of 21 days or 3,000 miles of transit between ports before refueling. Affectionately known as the "litter box" the Point Sur's engine room houses twin 565-hp D379B Caterpillar main propulsion engines and two 175kw 3406 Caterpillar generators. Propulsion comes from two 5½ foot diameter Hundstead controllable pitch propellers.

## A Short Vessel History

The Point Sur's keel was laid in 1981 by Atlantic Marine Inc. in Florida. Born as the research vessel Cape Florida, she was originally operated by the University of Miami on the East and Gulf coasts. Realizing that there was a need for the vessel's talents on the West Coast, the National Science Foundation transferred her to Monterey Bay, California where she has since operated for the past 30 years. During this time, the Point Sur's role has been to act as a platform for countless scientists to discover the mysteries of the sea. Her screws have also turned to the farthest reaches of the Aleutian Islands and recently, 8,200 miles to Antarctica. Marine biology, chemical oceanography, geology, and meteorology are just some of the areas in which she has helped to contribute to the greater knowledge of our oceans. According to Chief Engineer Barrett Carpenter, the Point Sur is a resolute vessel with an equally determined and hardworking crew.

**"FloScan fuel computers were installed on the Point Sur's main engines for two reasons; to reduce its impact on the ocean environment and because the vessel is federally owned and funded through taxpayer dollars, so consuming less fuel helps to conserve valuable government resources."**

—Barrett Carpenter  
Chief Engineer, R/V Point Sur

## Current Mission And Status

As this case study was being developed, the Point Sur was returning to her home port at Moss Landing, California after a five month scientific deployment to Antarctica. While there she operated out of Palmer Station and carried scientists who were studying geological formations, tracking whales, and diving for marine organisms. The information for this case study was developed while the Point Sur was still in transit heading north from Antarctica making stops for additional science operations including seismology off the coast of Chile, and chemical oceanography in the Sea of Cortez.



Photo Courtesy of Scott Hansen

## Reason For Installing FloScan Fuel Monitoring System On Vessel

"Ecology and efficiency are top priorities within the UNOLS fleet of research vessels," said Chief Engineer Barrett Carpenter "Therefore reducing human influence on the marine ecosystem is extremely important to Moss Landing Marine Laboratories and we are constantly looking for methods to more accurately monitor the Point Sur's fuel use. FloScan fuel computers were installed on the Point Sur's main engines for two reasons: to reduce its impact on the ocean environment and because the vessel is federally owned and funded through taxpayer dollars, so consuming less fuel helps to conserve valuable government resources."

## FloScan Equipment Installed

In 2009 the R/V Point Sur was equipped with two FloScan Series 8600 fuel computers, one on each of its D379B Caterpillar main engines. Included in the systems are supply and return sensors with pulsation dampers which achieve flow rate repeatability to 0.5%.

## Experience With The System Since Installation

"We have had positive results after installing FloScan fuel computers on the Point Sur in two key ways," Carpenter reported. "First, we have seen a reduction in the amount of fuel consumed because of changes in the way we

operated the engines and pitch settings on the propellers. From the gallons per hour feature on the FloScan display we have been able to fine tune the ratio between RPM, pitch, and load on the engines. Utilizing this data we have found the "sweet spots" where fuel economy and speed are maximized. Second, we have seen a reduction in the amount fuel ordered and therefore purchased because of a more accurate knowledge of how much fuel is on the vessel. We often order fuel while out at sea and load it from a fuel tanker truck. Traditional soundings of our storage tanks are not precise while the ship is rolling around in a sea way. After totalizing the numbers displayed on our FloScan fuel computers, we can accurately see how much fuel has been consumed since our last set of correct soundings. This in turn allows us to order fuel more strategically based on current price and how much we need to get us to our next port of call. Since installing the FloScan equipment I estimate the vessel has seen an average reduction in fuel consumption in the range of 6-percent. The Point Sur burns approximately 35,000 gallons of fuel annually which equals a savings of 2,100 gallons per year."

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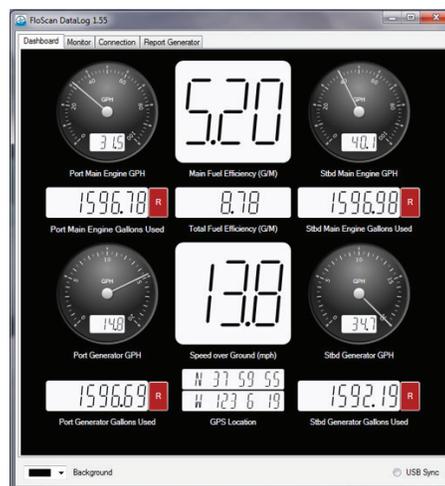
**—Barrett Carpenter  
Chief Engineer, R/V Point Sur**

### Future Use Of FloScan Systems

"We are in the process of putting together a budget to upgrade the FloScan Fuel Computers on our main engines to include both generator engines," said Carpenter. "We hope to install the FloNET DataLog peripherals to our system so that real time fuel usage data can be displayed in the wheelhouse to better maintain fuel efficiency under various sea conditions and to automatically log all fuel data for future review. This would allow our mates on watch to further improve efficiency while making adjustments to RPM and pitch."

### Conclusion

Over the past 3½ years the Point Sur has employed FloScan's most basic system with analog gauge readouts and has used it to monitor only the main propulsion system of the vessel. Since the installation the system the vessel has achieved an average fuel saving of 6% per year in addition to reducing the cost of the fuel purchased during long excursions by helping the crew better track overall fuel consumption and fuel on board. This function allowed them to schedule refueling at ports with the most advantageous fuel prices. With the addition of sensors on the vessel's generators and upgrading to FloNET networking capabilities with GPS link and DataLog software they will benefit from even more accurate monitoring of real-time fuel consumption to fine-tune engine RPM and propeller pitch settings to match prevailing sea states achieving even greater reductions in fuel usage. The ability to review historic operational data via DataLog software will allow even more flexibility in refueling schedules, review of the operating parameters of monitored engines and generators and provide the ability to generate detailed reports for trips or trip segments with a few mouse clicks.



## The FloScan Advantage

For over 40 years, FloScan Instrument Company, Inc. has been a world leader in Fuel Flow Monitoring Systems amassing an unmatched record of accuracy, reliability and safety. During this period, over 750,000 FloScan fuel flowmeters have been installed on engines in workboats, trucks, general aviation aircraft, industrial generators and automobiles in both OEM and aftermarket applications.

FloScan flowmeters can be fitted onto almost every make of diesel engine rated from 25hp to 6000hp including Caterpillar, Cummins, Detroit Diesel, EMD, John Deere, Luggar, MAN, Mitsubishi, MTU, Niigata, Scania, Volvo, Wartsila and Yanmar to name a few. On commercial marine applications, FloScan users are able to keep track of engine fuel usage and pinpoint their vessels' most fuel efficient running speeds. This data alone can improve fuel economy up to 20% or more.

FloScan's proprietary flow sensor design was developed specifically to satisfy the operating conditions of diesel and other internal combustion engines—unlike general purpose flow sensors which do not address many of the conditions encountered on diesel engines. It is the only design which combines ALL of the following features—each of which is essential to long term on-engine accuracy, low operating costs and fail-safe operation.



**Infinite Bearing/Rotor Life** — The rotor shaft/sapphire jewel bearing system exhibits no measureable wear after years of continuous service. This "no wear" feature means that mechanical maintenance is nil and the factory calibration is permanent.

**Vibration Immunity** — The flow sensor bearing system is immune to the severe vibration of diesel engines.

**Entrained Air Immunity** — The flow sensor design is resistant to entrained air caused by suction leaks in the fuel feed line.

**Low Pressure Drop** — Diesel engine manufacturers specify maximum permissible pressure drops for devices installed in the fuel suction line. FloScan flowmeters create a pressure drop of only 1 PSI at rated flow which meets engine manufacturers specifications.

**Internal Bypass** — The pressure drop of the FloScan flow sensor does not change in the Blocked-Rotor condition. Fuel continues to flow unimpeded. This feature eliminates the need for a separate bypass system. It is the reason why the FloScan design is dominant in the general aviation market.

**Extreme Repeatability** — Most diesel engine fuel consumption measurement systems employ two flow sensors, one in the fuel supply line and the second in the fuel return line to the tank (the fuel consumption rate being the supply flow rate minus the return flow rate). Often the supply flow rate and return flow rate far exceed the actual fuel consumption rate, and any resulting error in the fuel consumption rate is magnified accordingly. The use of highly repeatable flow sensors, which maintain their repeatability over many years, copes with this situation. FloScan flowmeters maintain their remarkably high repeatability of +/- 0.5% after years of on-engine service. This superior repeatability is a critical advantage in measuring the fuel consumption of a diesel engine.

**Pulsation Dampening** — Fuel flow pulsations affecting flowmeter accuracy often occur in diesel engine fuel systems. FloScan Systems include pulsation dampers to ensure flowmeter accuracy. ■