



Cruise Ship Diesel-Electric Power Generation System

TYPE OF VESSEL

S-Class Diesel Electric Cruise Ship

- Overall Length: 719 ft
- Beam Length: 101 ft
- Passenger Capacity: 1258
- Crew Members: 580
- Gross Tonnage: 55,575
- Maximum Speed: 22 Knots

TYPE OF PLANT

Prime Power Generation

PRIME MOVERS

(2x) Sulzer 12ZAV40S
Diesel Engine-Generators
Each 8000 kW, 4160V @ 514 RPM

(3x) Sulzer 8ZAL40
Diesel Engine-Generators
Each 6000 kW, 6600V @ 514 RPM

CONTROL TECHNOLOGIES

Woodward 733

Integrated Control Package for speed control, load control, load-sharing, monitoring, and overspeed detection.

Woodward EGB Actuator

Hydraulic Actuator with Mechanical Ball-Head Backup

Ethernet Network

Inter-control network including Ethernet switches, and Modbus converters.

HMI / SCADA System

Touch-screen terminal in the engine control room for monitoring, alarming, trending, and event logging.



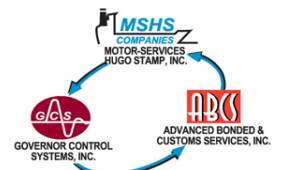
PROJECT OVERVIEW

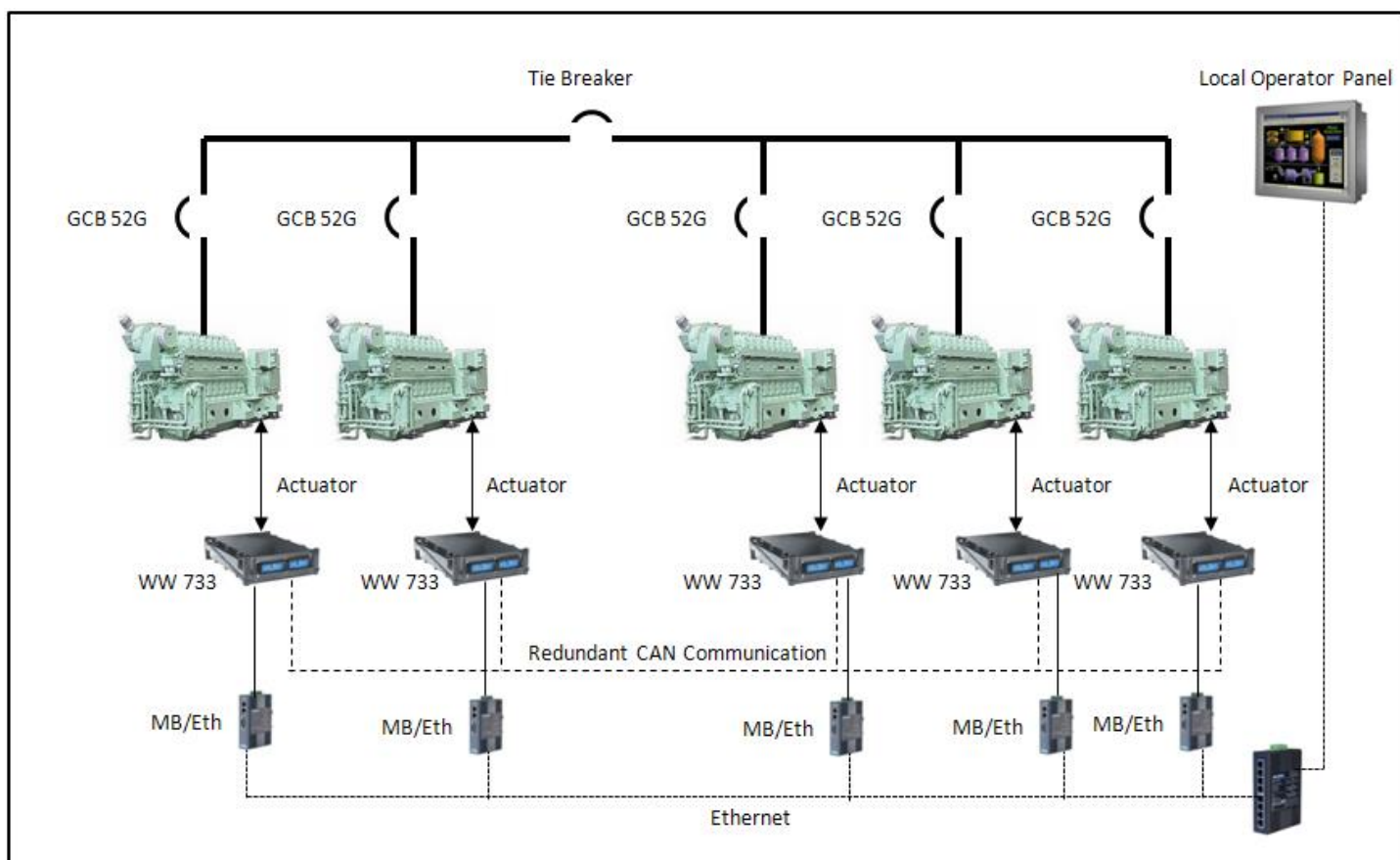
GCS custom-designed an engine-generator control and monitoring system for two diesel-electric S-Class cruise ships. The vessels utilize five Sulzer ZA40 engines for power generation, providing a total capacity of 34 MW at full load. The nominal engine speed is 514 RPM at 60 Hz.

The control system features custom application software integrating the engine speed control, load control, and load-sharing functionality into a single engine-level unit. The controls communicate to each other via a redundant CAN communication network. In the event of a primary CAN communication network failure, the control system alarms and automatically switches to the second network in a bump-less fashion.

The 733 controls were chosen to replace the obsolete Woodward 721 controls originally on the vessel. This choice allowed the addition of features that were previously unavailable including an adaptive start-fuel limiter to reduce the amount of smoke during engine starting. This is an important feature for cruise vessels that sail in Alaska and other areas where fines can be imposed due to excessive smoke during start-up.

Central monitoring and control is performed via a custom, GCS designed HMI system featuring a 17" color touch-screen terminal in the engine control room. The HMI gathers data from all five 733 controls and provides the operator with an interface for system control, monitoring, trending, alarming and event logging.





CONTROL SYSTEM FEATURES

Engine-Generator Control: Woodward 733 (x5)

- Engine Speed Control
- Isochronous Loadsharing or Droop Modes
- Generator Load Control
- Adaptive Start Fuel Limiter Map
- Overspeed Protection
- Redundant CAN Communication Networks
- Modbus over Ethernet Network to HMI System
- Interface to EGB Governor / Actuator
- EGB Features Mechanical Ball-Head Backup

HMI / SCADA System

- Touch-screen HMI in Engine Control Room
- 17" Color Screen
- Industrial Grade Fan-less PC
- On-Board Solid State Hard Drive
- System Monitoring and Control
- Integration of Five Engine Control Network
- Alarm Handling and Performance Data Trending
- Modbus and Direct Ethernet Comm. to Controls
- Multiple User Access Levels

As a part of the MSHS group of companies, GCS offers comprehensive control system support, from engine and turbine systems integration to turnkey project management for a broad range of marine, power generation and industrial projects. GCS engineers have experience with control system retrofits in all of these industries and aftermarket applications. Learn more at GOVCONSYS.COM.

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