



## Speed Control, Load Sharing & HMI Monitoring System

### TYPE OF VESSEL

Diesel Electric  
Holland America Line Cruise ships  
S-Class Maasdam  
S-Class Veendam

### PRIME MOVERS

Diesel Engine-Generators  
(2x) Sulzer 12ZAV40S  
Each 8000 kW, 4160V @ 514 RPM  
(3x) Sulzer 8ZAL40  
Each 6000 kW, 4160V @ 514 RPM

### CONTROL TECHNOLOGIES

#### Isochronous Load-sharing System:

**Woodward 733 Digital Control**  
Speed control, load-control, load-sharing, monitoring and overspeed detection.

**Woodward EGB Actuator**  
Hydraulic actuator with mechanical ball-head backup

**HMI / SCADA System**  
Touch-screen terminal in the ECR (Engine Control Room) for monitoring, alarming, trending and event logging.

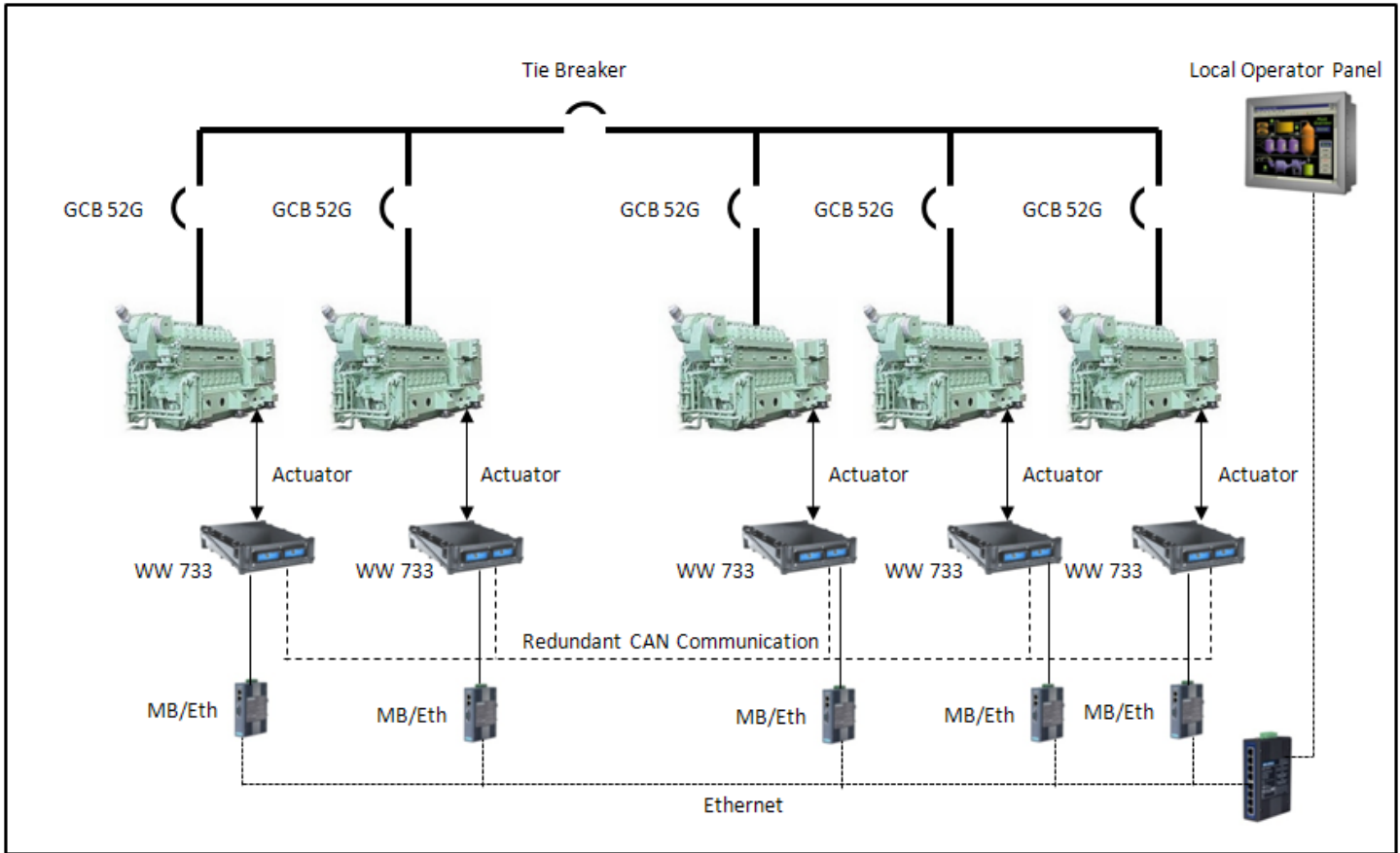


### PROJECT OVERVIEW

GCS custom-designed a digital Woodward control system for two diesel-electric Holland America Line S-Class vessels. The vessels operate five Sulzer ZA40 engines for power generation, providing 34,000 kW at full load, the nominal engine speed is 514 RPM at 60 Hz.

Woodward 733 digital controls replaced the obsolete 721 controls and added extra features that previously were not available: custom application software that integrates the engine speed control, load sharing and load control via a redundant CAN communication network. The 733 features an adaptive start-fuel limiter to reduce the amount of smoke during engine start, which 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.

For easy remote monitoring and trouble-shooting, GCS designed a HMI/SCADA system consisting of a 17" color touch-screen terminal in the ECR. This HMI communicates to all five 733 controls and is used to display all relevant data, trending, alarming and event logging.



**CONTROL SYSTEM FEATURES**

**Master/Supervisory Control:** *Woodward 733 Controls (x5)*

- Speed Control
- Isochronous Load Share or Droop Mode
- Load Control
- Interface to EGB Governor
- Start fuel limiter map

**HMI / SCADA System**

- Touch-screen HMI
- System Monitoring
- Alarm Handling and Performance Data Trending
- Modbus and Direct Ethernet Comm. to Control
- Multiple User Access Levels

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 is a member of the MSHS Group. **Learn more at [www.govconsys.com](http://www.govconsys.com).**

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