



## Project Overview: Gas Turbine Power Generation

CS7520

### ▼ TYPE OF PLANT

Paper Mill  
Prime Power Generation  
Utility Paralleled in Droop Base Load  
and Black Start Isochronous

### ▼ PRIME MOVERS

Rolls Royce Olympus Gas Turbine  
Dual Fuel Injection (Gas and Liquid)  
Inlet Fuel Pressure: 250 psi  
28 MW, 13.8 kV, 0.8 PF @ 60 Hz

### ▼ CONTROL TECHNOLOGIES

#### **Woodward MicroNet Plus**

Gas Turbine Digital Control System for fuel control (governing), start/stop sequencing, turbine protection, and monitoring, featuring redundant power supplies and CPUs with bumpless transfer.

#### **Wago Modules**

Remote Input / Output Modules for Signal Expansion.

#### **Basler DECS-200**

Redundant Automatic Voltage Regulator for generator voltage control, UEL/OEL limiters, AVR/FCR mode and bump less transfer to standby unit.

#### **Woodward ProTech GII**

Independent Over-speed Protection Device with two-out-of-three voting.

#### **Woodward EGCP3**

Generator synchronizer with option for load sharing (future).

#### **Workstation and HMI System**

Two touch-screen panels in the control cabinet door and a desktop workstation in the plant control room for monitoring and control of the system.

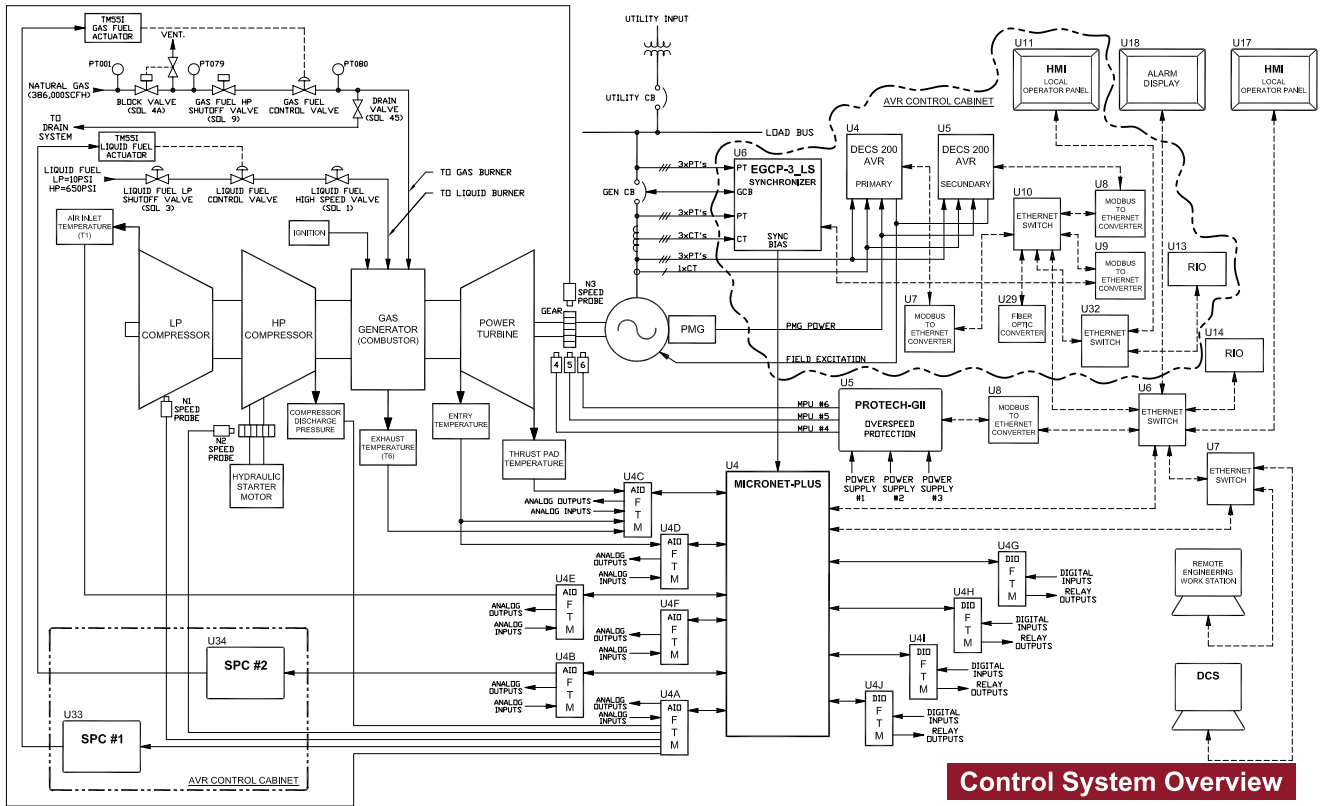
### ▼ PROJECT OVERVIEW

**GCS** has supplied a gas turbine-generator control, monitoring, and fuel metering system for a large paper mill as a retrofit package on an old outdated control system. The plant utilizes multiple turbines including this Rolls Royce Olympus SK-30 package rated for 28.0 MW @ 60 Hz. The plant runs in parallel to the utility in baseload mode, additionally it is capable of performing black start up in isochronous mode.

The new control system features the Woodward MicroNet Plus Control Platform with custom application software performing functions including automatic turbine start / stop sequencing, fuel control, exhaust gas temperature monitoring and turbine protection. The MicroNet Plus hardware includes redundant power supplies and CPUs. In the event of a power supply or CPU failure, the control will automatically transfer control to the standby CPU in a bumpless fashion enabling the unit to continue to run until the appropriate module can be replaced. The system also includes an electronic over-speed protection device completely independent from the MicroNet Plus. This device utilizes three independent speed probes that trip the turbine only when 2 out of 3 modules agree. **GCS** has included a redundant voltage regulator for generator excitation in a primary / standby fashion following the same redundancy principle. The controls are packaged in two double-bay free-standing control cabinets.

Central monitoring and control is performed via a custom HMI system featuring dual industrial grade touch-screen terminals in the control cabinet door along with a second desktop workstation in the plant control room. The HMIs provide the operator with complete system control including starting, stopping, and synchronization of the turbine.





Control System Overview

Control System Cabinet

- ▶ 2x Double-Bay Freestanding Cabinet (60"Wx36"Dx84"H)
- ▶ Door Mounted Touch-Screen HMI Dual AC Power Supply Feeds
- ▶ Redundant DC Power Supplies
- ▶ Dedicated Hardwired Safety Trip System



Original System



New System Installed



Interior of New Control Cabinet

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) or email us at [sales@govconsys.com](mailto:sales@govconsys.com)

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