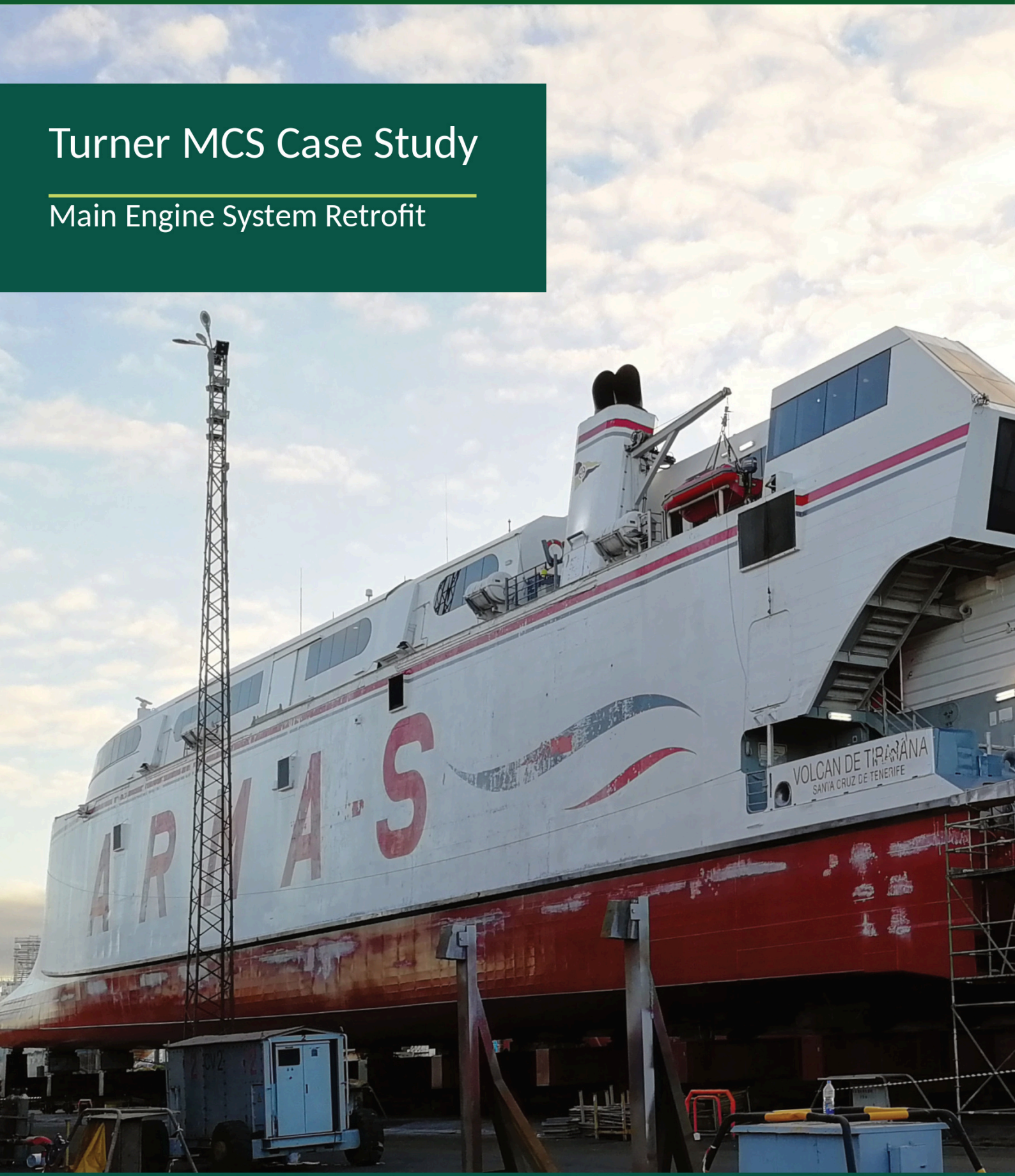
TURNER ENERGY CONTROL SOLUTIONS

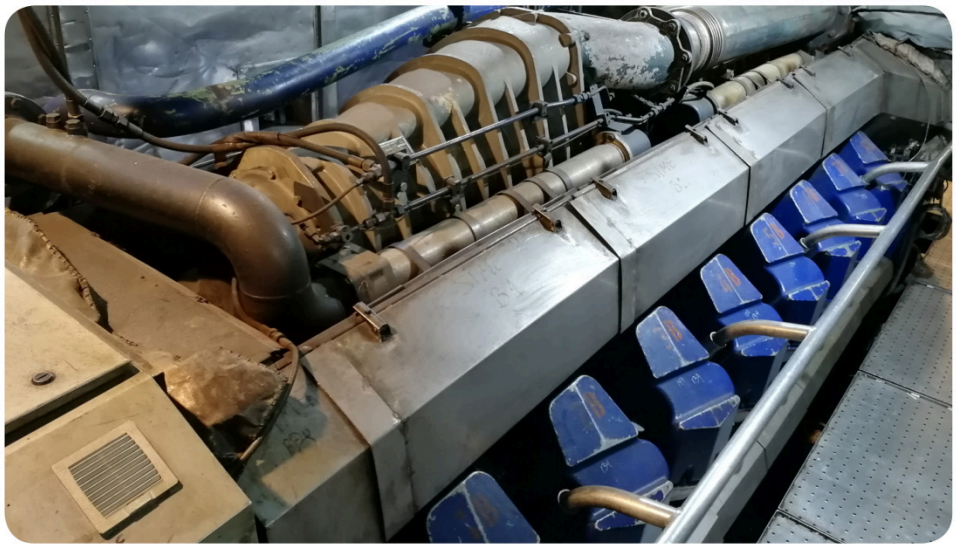
WOODWARD Business Partner

February 2019

Turner MCS Case Study

Main Engine System Retrofit





Introduction

Turner MCS performed an upgrade of four 16RK280 diesel engines powering the jet propellers on a 98m fast ferry catamaran sailing in the Canary Islands. Parts' obsolescence was the main reasons why Turner ECS received the order to replace the existing electronic injection and speed control system for each engine.

Latest Woodward Hardware

Woodward's new Flex 500 hardware platform was selected as the new main controller performing speed control, I/O management and backup safety features. In addition Woodward's new LECM hardware platform was selected to perform electronic fuel injection, safety features and backup speed control. The new hardware allows the customer to take complete ownership of the system with unrestricted access to both the application software and all system diagnostics using dedicated software tools.

System Redundancy

Engine safety is guaranteed with a new redundant system design. Both the Flex 500 and the LECM monitor all safety channels. In addition a DNV approved electronic overspeed device has been installed. The system also includes three junction boxes containing remote I/O modules which collect measurements from sensors on the engine.

Fail-Safe Communication

Two CAN networks have been installed to allow all devices to communicate with each other. One network is dedicated to remote I/O data collection and one network is dedicated to the communication between the two main controllers. In addition, the Flex 500 communicates via Modbus to the ship control system. Two communication gateways allow remote access to the main controllers and the HMI for live troubleshooting and system monitoring.

LATEST WOODWARD HARDWARE

CYLINDER EXHAUST GAS BALANCING

SYSTEM REDUNDANCY

FAIL-SAFE COMMUNICATION

COMBUSTION OPTIMIZATION

INSTALLATION & COMMISSIONING

PROJECT DETAILS

ELECTRONIC FUEL INJECTION

- 16 cylinder injection control
- Exhaust gas temperature balancing

ENGINE CONTROL

- Redundant speed control
- Redundant engine protection
- Start/stop sequencing
- Fail safe logic

FACT SHEET

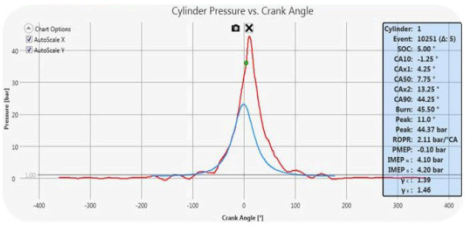
Engine OEM:	MAN B&W
Engine Type:	16RK280
Ship Name:	Volcan De Tirajana
Ship Number:	HULL 062
Ship Builder:	INCAT

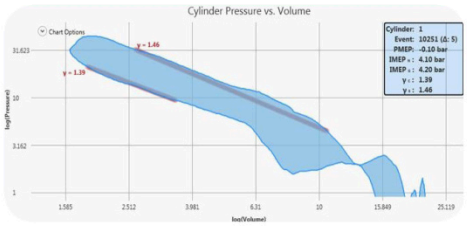
Cylinder Exhaust Gas Balancing

Cylinder exhaust gas temperature balancing was introduced as a new feature by configuring the LECM to increase or decrease injection duration on each cylinder. This guarantees a lower peak temperature and lower cylinder-to-cylinder and bank-to-bank temperature deviation.

Combustion Optimization

Combustion optimization has been achieved by monitoring live cylinder pressure and by using an EFI system for real-time combustion diagnostics and control.



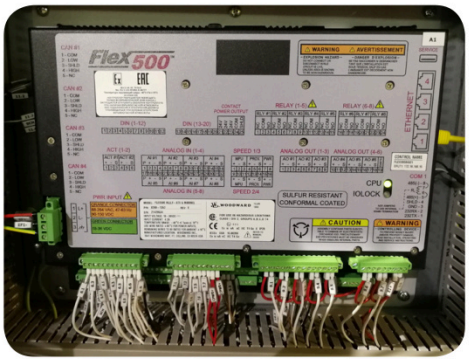


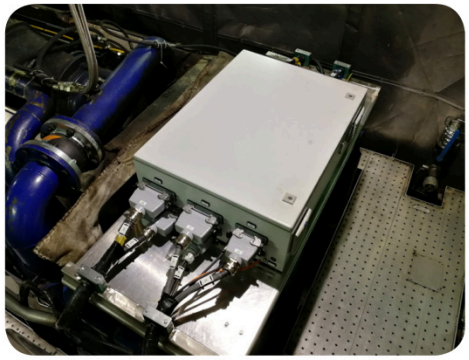
Installation & Commissioning

All four engines were started and tested on load and the complete functionality was tested as specified in the site acceptance test document prepared by Turner MCS and signed off by the customer. This included new functionalities with respect to the old system e.g. temperature balancing.

Before

After

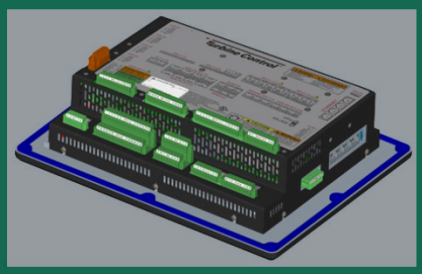




HARDWARE USED

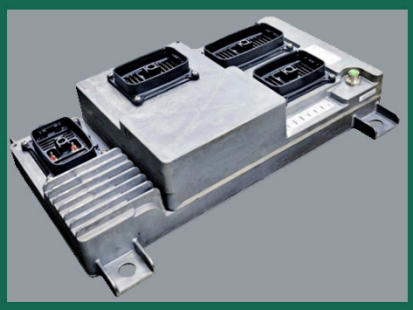
WOODWARD FLEX 500

- Main system control
- Communication manager



WOODWARD LECM

- Electronic fuel injection
- Temperature balancing



HUMAN MACHINE INTERFACE

- Touch panel
- Customized software

REMOTE I/O

- Distributed junction boxes on CAN network

HARDWARE REPLACED

- Regulateurs Europa Viking 25
- Mecel Bank Controller Modules

TURNER ENERGY CONTROL SOLUTIONS

WOODWARD Business Partner

Turner Range of Services

LSTK Projects, Retrofits & Upgrades

Turner ECS delivers reliable retrofit solutions for a wide range of prime movers and other applications. This includes lump sum turnkey projects on turbines and compressors.

Genuine Parts & Service Exchange

Turner ECS has the largest stock of parts, service exchange governors and electronics in Europe and can provide a fast turnaround service.

Product Training

Turner ECS can provide official Woodward product training covering both theoretical and practical training on a wide range of Woodward products.

Electronic Repair & Mechanical Governor Overhaul Service

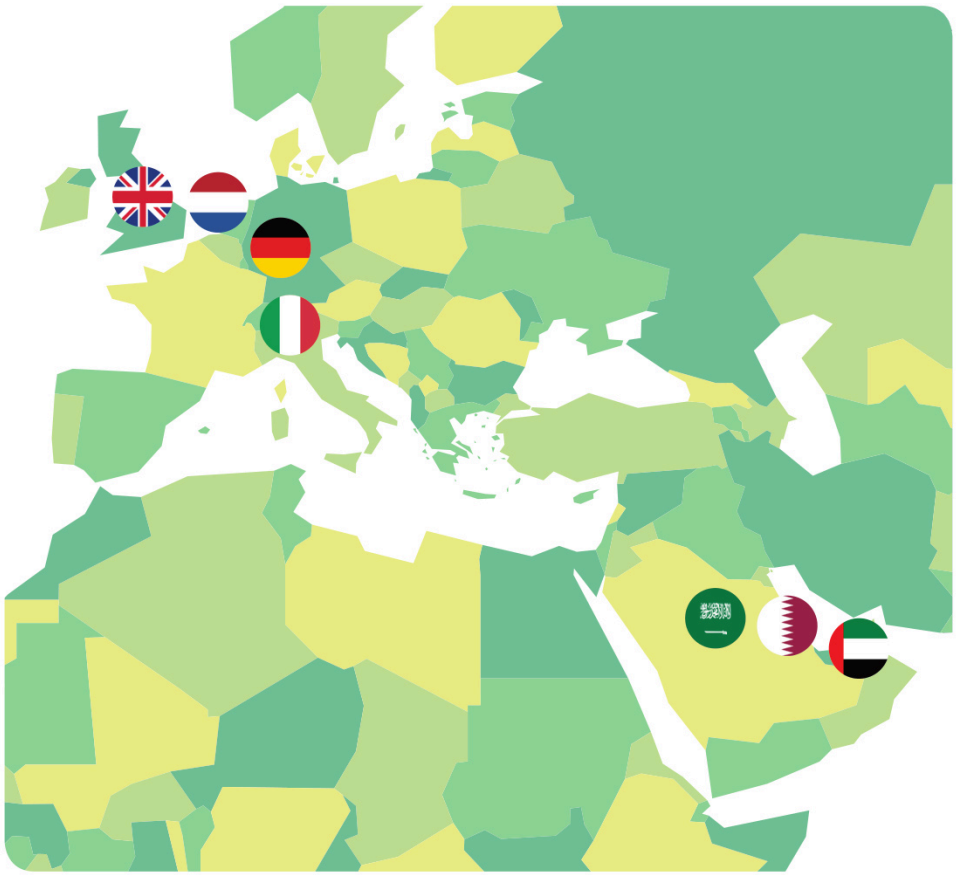
Turner ECS provides a comprehensive overhaul and repair service for electronic, mechanical and hydraulic governors.

World Wide Field Service

Turner ECS field service engineers and technicians provide comprehensive solutions for commissioning and on-site repair.

Service Contracts

Turner ECS provides long term service contracts to support users with Woodward governors and/or control products and electronic control systems.



ROTATING EQUIPMENT CONTROL SOLUTIONS DELIVERED ACROSS EUROPE & THE MIDDLE EAST

Turner ECS is an official Woodward Channel Partner with offices located in:

- The Netherlands
- England
- Germany
- Italy
- Abu Dhabi
- Qatar
- Saudi Arabia

Turner ECS also operates and manages an extensive network of official agents throughout Europe & the Middle East

---

CONTACT INFORMATION

Turner Engine Control Solutions B.V.
Dirk Storklaan 76
2132 PX Hoofddorp
The Netherlands

Mail: sales@turner-ecs.com
Tel: +31 (0) 23 566 23 00
Fax: +31 (0) 23 564 27 27
Web: www.turner-ecs.com