

# Integrated Environmental Monitoring System of Hangzhou Bay Bridge



## Project Introduction

Hangzhou Bay Bridge is a long highway bridge with a cable-stayed portion across Hangzhou Bay in the eastern coastal region of China. It connects the municipalities of Jiaxing and Ningbo in Zhejiang province. At 36km (22 mi) in length, Hangzhou Bay Bridge is one of the longest trans-oceanic bridges in the world. The bridge shortened the highway travel distance between Ningbo and Shanghai from 400 km (249 mi) to 280 km (174 mi) and reduced travel time from 4 to 2.5 hours. The solution provider applied Kyland switches in the network infrastructure of the Integrated Environmental Monitoring System, which refers to the process of implementing environmental data collection and broadcasts.

## System Requirements

- Serial device server integrated Ethernet switches are required to connect peripheral serial devices and form a redundant fiber ring
- The devices should be able to work under damp and high temperature harsh ocean environments
- The devices should be anti corrosion due to the strong salt spray fog

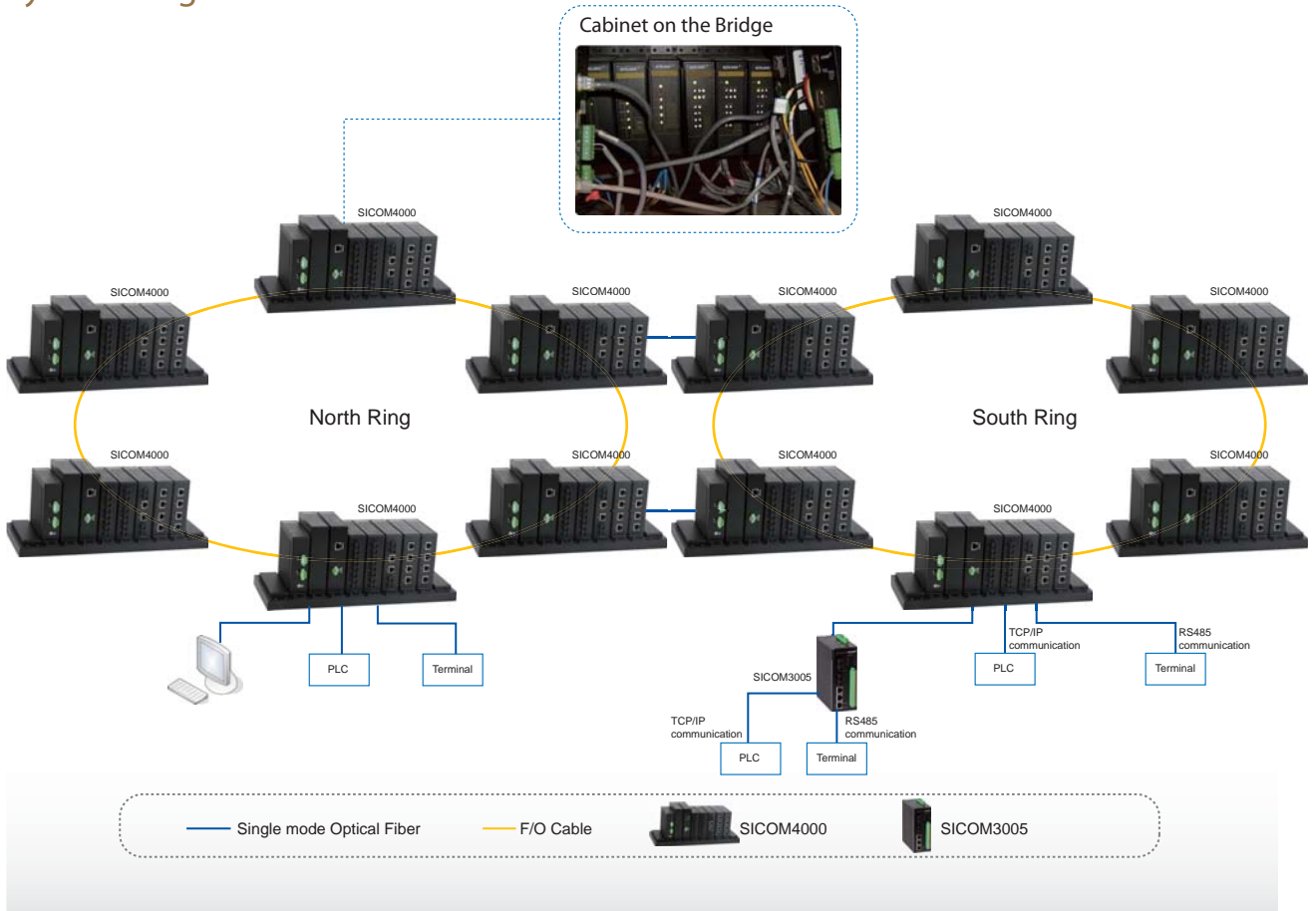
## Kyland Solution

Kyland offers the network solution for the whole system, which consists of vehicle control, bridge information broadcasting, power monitoring, bridge weather station, steel structure drying, and aircraft warning light systems. There are 23 Kyland SICOM4000 industrial Ethernet switches deployed in the North and South fast Ethernet redundant fiber rings that control 33 message sign boards, 39 street lights, 39 power monitoring stations, 4 bridge weather stations, 5 vehicle license plate recognition devices, and 24 aircraft warning lights on the top of 3 178m height bridge towers. The system ensures all traffic and weather information are reliably broadcasted and keeps traffic running smoothly and safely.

Kyland SICOM4000 is a serial card integrated modular industrial Ethernet switch. It allows the serial devices to transmit serial communication signals together with other Ethernet data locally. All SICOM4000 are connected to fast recovery redundant tangent rings protocol (DT-Ring+) to bring the maximum reliability to the system.

The erosion of the materials caused by huge salt spray fog brings a huge challenge for the devices working in such an ocean environment. However, Kyland industrial Ethernet switches are specially designed for such a harsh environment, and its outstanding anti-corrosion performance with the conformal coating design, wide operation temperature and high EMC level features enable the devices to perform with unprecedented reliability and stability.

## System Diagram



## Why Kyland?

Kyland SICOM4000 is a modular Din Rail platform that supports not only fast Ethernet modules, but also serial ports card.

Specially designed to operate in salt spray fog, high humid, wide temperature and huge electromagnetic interference environments.

Fast recovery tangent rings protocol:

## SICOM4000

- Layer 2 24+4G Port Managed Din-Rail Modular IEC61850 Switch
- 4 1000Base-SFP ports
- 6 x module with 4 100Base-FX or 10/100Base-TX ports or 4 RS232/485 serial ports
- Operating temperature: -40 to 85°C (-40 to 185°F)
- IP40 protection rate, EMC level 4
- Industry: IEC61000-6-2
- Railway: EN50155, EN50121-4
- Traffic Control: NEMA TS-2



► Please refer to [www.kyland.com](http://www.kyland.com) for more details