

Case Study

8000+ Camera surveillance upgrade for Seoul Metropolitan Subway Corporation



Ensuring secure operations for 8 million commuter journeys daily, maintaining an effective security presence is mission critical for the success of Seoul's Metropolitan Subway network.

Seoul's Metropolitan Subway is the third most heavily used Metro system in the world, serving over 8 million journeys daily in, and around the capital of South Korea.

COE is providing a comprehensive upgrade to the surveillance equipment used to control security over lines 1, 3 and 4 of Seoul's metro network.

This upgrade will enable the security staff of the Metro network to streamline their operations and ensure the safety of the travelling public in Seoul with complete confidence.



COE equipment will be responsible for the transmission and management of over 8000 cameras across Lines 1, 3 & 4 of Seoul's Metro network.

Why Choose COE?

COE's rich history of providing highly reliable, fully redundant CCTV systems to some of the most prominent rail sites around the world was a key factor in the successful project bid for Seoul Metro. The experience the company brings in engineering best-fit hybrid network solutions and leveraging the benefits of both optical fibre and IP Ethernet transmission technologies was key to establishing the optimum solution for Seoul Metro and enabled a cost-effective, scalable and highly manageable system to be specified, integrating COE's state of the art transmission and management equipment.

When considering systems of this magnitude, developing an effective management and control strategy for the video footage is of equal importance to the transmission and recording technologies implemented in the project. In this case study, we will examine the requirements of the operators of Seoul Metro, and demonstrate how COE has delivered a CCTV network design which will fully satisfy the core requirements and operational goals of the client.

Identifying the requirements of a major rail network...

When identifying projects which may benefit from our advanced video surveillance, transmission & management technologies, COE focuses on developing strong relationships with our installation partners and also with the end user of the system. By developing these relationships, we gain an insight into our partners' key goals and the challenges brought on by the scope and scale of the projects.

Establishing strong ties with end users and also with our installation and project development partners allows COE to achieve the targets of these partners and to provide a true value-added service to our customers.



Between 64 & 128 cameras will be installed at each station of Lines 1, 3 & 4 of Seoul's Metropolitan Subway to provide total surveillance of the sites.

Through communication with end users and with our systems integration partner for Seoul Metro, COE identified the desires of the Metro staff who would operate the CCTV network on a daily basis, established performance expectations and requirements for the system, and identified the objectives of our partner who was to install the equipment for the network.

By taking these steps, we were able to design a system which fully satisfied the goals of every party involved, and that will provide an effective surveillance solution for many years to come.

Key objectives of the Seoul Metro project included:



Capability to maintain the operations and visibility of 8000 cameras across a single network.



The system chosen had to optimise the use of the current fibre effectively, as the new addition of point-to-point fibre through the tunnels was not an option (due to logistical & cost constraints).



Technological assistance to enhance the function of the CCTV operators was desirable, as there is an exceptionally large number of cameras to be operational concurrently.



Continuous operation with no downtime or lost footage, which is key for mission critical environments such as metro networks. This meant eliminating potential network downtime was essential.



Access to cameras from multiple stations across the network to be facilitated at multiple control rooms around the network.

COE's solution for Seoul Metropolitan Subway Corporation

“Capability to maintain the operations and visibility of 8000 cameras”

In total, equipment will be installed in 70 stations across three lines of Seoul Metro. Each station will have a camera capacity of between 64 and 128 cameras. The combined camera count brings the capacity of the network to well over 8000 cameras. COE's unique network architecture solution will facilitate instant uncompressed video transmission from any of these cameras by optimising usage of the existing optical fibre.

“Technological assistance to enhance the function of CCTV operators”

COE's I-Command SmartDetect analytics platform will provide intelligent video analysis of the video stream from over 1000 cameras across the three lines of Seoul Metro. The following actions will be undertaken utilising SmartDetect:

- PTZ cameras will be equipped to automatically track suspects' movements around a station.
- Fixed cameras will alert to suspicious packages and defined activities (e.g. Loitering and crowding).
- Zone alarms will register unauthorised access to restricted areas.
- Operators will also be alerted to ticket barrier avoidance.



COE X-Net VI identifies suspect packages and activities with over 1000 cameras acting as 'electronic eyes' for the network.

“Access to cameras from multiple stations across the network”

The system design that COE has implemented facilitates viewing and control for any of the 8000+ cameras across the entire network of the Metro. The cameras are made available instantly with switching and rights-based PTZ control available for any camera at any of the four control rooms.

“The system chosen had to optimise the use of the current fibre effectively”

The existing fibre infrastructure of the site cannot easily be modified due to the expense and logistical constraints of operating in tunnels where trains frequently travel. Due to this limitation, COE's X-Net Range, which features a wide range of devices which may be Coarse Wave Division Multiplexing (CWDM) enabled, was a clear choice for video transmission across the network of Seoul Metro.



COE's entire X-Net Range is equipped for use with SFP lasers, which have numerous advantages over traditional lasers

COE's entire fibre optic transmission range is equipped with SFP (Small Form-factor Pluggable) optical ports, which are compatible with CWDM enabled optical lasers. This technology permits up to 144 channels of uncompressed video with data and alarms to be transmitted across a single optical fibre simultaneously. This was critical at Seoul Metro, as it provided a means to transmit a large number of video channels across long distances simultaneously.

“Continuous operation with no downtime or lost footage”

Rail environments require video surveillance to protect against threats such as terrorist attacks and accident liability protection. These environments require that the network is never compromised due to error or device failure, and as such, Seoul Metro’s requirement was that the system chosen would operate with optimal performance in demanding conditions, and that any potential failure in the system would have little or no effect to the performance of the system.

When designing both our products and CCTV networks for our clients, COE ensures that maximum redundancy measures are integrated at every possible avenue, to prevent the risk of network downtime or failure.

Our entire product range has many integrated safe-proofing measures which ensure consistent performance and reliability over the product cycle.

For Seoul Metro, features such as dual parallel power supplies and CPUs, a dual ring network architecture with automatic switching and SFP optic ports on the fibre modules will be utilised to ensure the system will not fail due to incidental failure of devices, and further more, that if one transmission path is broken, the signal upon it will be delivered through alternate paths and result in no recording or video streaming loss.



The X-Net Range offers the highest redundancy proofing measures available in the CCTV video transmission market.

What is the secret to providing an optimum network solution?

There is not one sole factor which creates an optimum solution for our clients. An optimum solution is made up of a combination of technologies, network design expertise and the flexibility to fully accommodate the customer’s requirements.

Through nurturing strong relationships with both our installation partners and end users for each project, and providing appropriate training to assist in the installation and hand-over process, COE ensures that the CCTV solution chosen will fully satisfy the requirements of the user.

Expertise in product engineering and project design enables COE’s solution architects to establish the optimum product combination to satisfy our clients’ requirements. As COE offers products which span the range of transmission and management options available without bias, the specifications chosen will reflect the true needs of the customer.

Seoul Metro is a major project spanning a very large rail network. The system to be installed will be a comprehensive security upgrade that will both streamline and enhance the operations of the security staff across the 70 stations where surveillance is to be upgraded. COE is proud to be an instrumental part of this major upgrade to surveillance activities, and we are confident that operations across Lines 1, 3 & 4 of Seoul Metropolitan Subway will be made safer for the travelling public and rail staff on site for many years to come.