



CASE STUDY

Hong Kong University's Faculty of Medicine Leverages LightPointe Optical Wireless to Beam High-Bandwidth Imaging and Video Files

Secure, High-Speed Connectivity Solution Links Faculty of Medicine with Queen Mary Hospital to Allow Advanced, Intuitive Teaching

Founded in 1911, the University of Hong Kong (HKU) is one of the region's oldest universities. Its Hong Kong College of Western Medicine, which today is called the Faculty of Medicine (FOM), was established 24 years before the university's founding. Sun Yat-sun, who is recognized as the father of the Chinese democratic revolution, is one of HKU's many distinguished graduates. It has been said that during his days at FOM, Mr. Sun Yat-sun began to adopt the Western democratic ideas that led to his meritorious service in founding the Republic of China. The Faculty of Medicine of HKU, therefore, not only has played a pivotal role in the region's tradition of medical training, but also can lay claim to significant contributions to Chinese modern history.

Today, with a legacy of more than 100 years of teaching, FOM has become an organization of considerable scale. Besides training doctors and paramedics, it also holds a leading position in medical research and clinical services while making ongoing efforts to benefit humanity. FOM maintains 16 separate research centers, reflecting the school's emphasis on collaborative research.

The world-renowned Genome Research Center is under the leadership of Professor Xu Lizhi, president of HKU, and is dedicated to cutting-edge research that covers cytobiology, biochemistry, chemobiology, bioinformatics and clinic medicine.

THE CHALLENGE:

Queen Mary Hospital, located 1.2 kilometers from HKU, is the teaching base for FOM, with a role that combines education, medical treatment and research. The 1,400-bed hospital provides comprehensive medical services to the region, employing a staff of approximately 3,800. The mission of Queen Mary Hospital is to deliver quality professional services to patients, integrating medical technologies acquired through collaboration with government, FOM and the hospital's own resources. To that end, FOM began an initiative to leverage digital imaging for teaching purposes, with hopes of transmitting large graphics

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Qu Dong Cheng | Information Technology Chief,
FOM



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files of select surgeries from the hospital to the university for professors to use during lectures and other intensive training. In addition, it sought to produce live video broadcasts of surgeries for transmission in real time from Queen Mary Hospital to FOM's teaching facilities. These high-bandwidth exchanges required adherence to the strictest requirements for quality, in terms of definition and balance, so that students could easily recognize the most intricate of details, including human organs and veins. To achieve such high resolution, videos needed to be coded with MPEG2. Although it provides excellent digital quality, MPEG2 only offers a limited compression ratio and therefore requires bandwidth greater than 10 Mbps.

Consequently, the university was challenged to find a high-speed connectivity solution capable of supporting these bandwidth-intensive requirements for sending video and data files between facilities. FOM's IT team evaluated a variety of options including microwave radio, an existing campus Ethernet network, fiber-optic cable and ultimately, optical wireless.

Enterprise-class microwave transmission was quickly eliminated for a number of reasons. First, it only reaches speeds of 10 Mbps, which simply was not substantial enough for the university's needs. In addition, the technology is easily affected by the density of atmospheric water molecules, such as rain and hail. In Hong Kong's moist, sub-tropical climate, this presented serious concerns. The biggest disadvantage, however, was when the university discovered that microwave radiation might affect the normal operation of the hospitals' medical equipment - a risk that could not be taken.

HKU also considered using its own Kilomega Ethernet intranet, which already links campus buildings including the surgery wing at Queen Mary Hospital. Concerns then arose because the bandwidth of the network is shared, making it unsuitable for high-resolution image transfer. Other roadblocks were encountered when HKU considered fiber-optic cable. The alternative of deploying its own fiber was evaluated, but FOM's IT team soon found this undertaking to be too time consuming and complicated—not to mention prohibitively expensive.

Just when FOM thought all options for a high-bandwidth link had been exhausted, the IT team was introduced to LightPointe by Futac (a Hong Kong-based LightPointe partner). LightPointe is a pioneer in the development of optical wireless solutions based on free-space optics (FSO) technology and the company designs and manufactures license-free, high-speed outdoor wireless products that have earned high marks in both government and enterprise networking installations. Optical wireless products can link two or more buildings with classic LAN-to-LAN backbone connectivity, delivering bandwidth from 100 Mbps up to 1.25 Gbps.

Initially, FOM's IT experts were unfamiliar with the technology and were uncertain about its use of light as a transmission medium. They also worried about the effects of weather on the reliability of the solution. To allay all concerns, they arranged three tests, one of which coincided with a heavy storm. The transmission speed was tested by FTP, and the MPEG2 video transmission between Queen Mary Hospital and FOM's teaching building was also carefully evaluated. All results were compared with that of a direct link in the same building.

FOM's IT team found that LightPointe's gear surpassed their expectations in all three tests, even during inclement weather. It quickly became clear that optical wireless represented the best all-around choice for HKU.



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THE SOLUTION:

HKU ultimately selected the LightPointe FlightStrata™ 155E, a high-performance Optical Wireless system with full-duplex throughput of up to 1.55 Mbps. As LightPointe's flagship product, FlightStrata not only delivers maximum performance, but also offers Multi-Beam Array Tracking (MBAT), Automatic Power Control (APC) and Optical Beam Shaping (OBS). These advanced features ensure system redundancy via multiple send-and-receive paths, provide additional power during reduced weather visibility and allow continuous adjustment to address any movement from building sway. Ideally suited for major enterprises and telecommunication carriers seeking fiber-like connectivity, FlightStrata incorporates four beams and four receivers, plus auto-tracking capabilities, to deliver improved performance over two dozen city blocks.

THE BENEFITS:

Installation of the LightPointe equipment went smoothly. According to Albert Au, Project Coordinator for FOM, LightPointe's high-speed transmission capabilities have quickly given the university the power to vastly improve its teaching capabilities through the use of digital imaging and real-time video. "There are many advantages to our LightPointe solution," he said. "It was easy to install, the cost was low, and we are confident in the stability of the equipment, since it has been widely used in the telecommunication field and by many international companies. As an added bonus, we have surplus bandwidth that can be used for other worthwhile applications."

FOM was also pleased to find that the FlightStrata employs license-free spectrum worldwide, virtually eliminating the possibility of transmission interception, due to an inherent immunity to radio interference because the products use invisible beams of light to transmit and receive voice, video and data. This gives FOM added assurance that its sensitive patient data is protected with the utmost security.



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CUSTOMER:

The University of Hong Kong, Faculty of Medicine (www.hku.hk/)

INDUSTRY:

Education and healthcare

CHALLENGES:

- High-speed communications link required between Faculty of Medicine and Queen Mary Hospital, located 1.2 kilometers away.
- Bandwidth-intensive imaging and video applications required connection greater than 10 Mbps of bandwidth.
- Network reliability and protection of highly sensitive data were top priorities.
- Microwave was eliminated due to slow speeds and potential impact on operation of hospital equipment.
- Fiber-optic cable proved to be too costly and complex to install.

SOLUTION:

- LightPointe FlightStrata 155E with Multi-Beam Array Tracking (MBAT), Automatic Power Control (APC), Optical Beam Shaping (OBS) and connectivity speeds up to 1.25 Gbps.

BENEFITS:

- High-speed LightPointe link supports bandwidth-intensive digital imaging and video applications, with surplus bandwidth available for other purposes.
- Secure, reliable LAN extension withstands sub-tropical weather and virtually eliminates concern for transmission interception.
- Convenient wireless link requires no trenching for trouble-free urban installation.
- Meets all customer requirements for cost and ease of installation