

Photonic Technology as the Basis of the Information-sharing Society

Kazuhiro Komatsu
Director of NTT Photonics Laboratories

"Flat-rate pricing introduced to mobile phone data communication services, offering a maximum communication speed of 2.4 Mbit/s". "30% of new FTTH subscribers have shifted from ADSL". These are the latest headlines on the telecommunication business news in Japan. Wireless LANs are spreading into the community and mobile phones equipped with 2-million-pixel digital cameras are about to be marketed. Newly developed telecommunication tools and an infrastructure are being prepared for various applications. A great deal of information is being generated, sent, and accessed for personal use, just as it is for business use.

When many people connect to the Internet through broadband access anywhere and any time, a widely deployed high-speed network will be required. For personal use, limited service quality is often tolerable if the price is low, but for business use, we must provide a secure network with guaranteed transmission speed. Telecommunication systems must be able to adapt to the various needs of customers. They must also be able to cope with dynamic changes in traffic and even evolve as technology progresses. We must build a safe, secure, adaptable, and user-friendly environment for the new generation of telecommunication systems.

Photonic technology is an essential component of this telecommunication environment. Light can carry wideband signals over long distances. Moreover, we can transport large amounts of information by transmitting light at various wavelengths through a single optical fiber. These features of light have already been put into practical use as essential transmission technology. The advantages of light are not simply high speed and high capacity; it also has the potential to be the basis of various network services. For example, the development of new wavelength-based services is the next target. Wavelength routing technology makes it possible to change the destination of the light by choosing the wavelength using a tunable laser. This technology can be used to build an adaptable network because the network structure can be

changed in the event of a failure. Applying wavelength-multiplexing technology to subscriber lines is also beneficial because it can provide multiple services including television distribution via a single optical fiber to the home.

Devices that can handle light effectively are essential if we are to develop a network that takes full advantage of its features. The technical development of materials, design, fabrication, and packaging is needed if we are to produce optical devices that can change the network system on a large scale. Such devices must be combined and miniaturized, broadened in scale, or integrated to construct modules or subsystems that can be easily used to build the network. It is also important to develop technologies that can produce these devices inexpensively and on a large scale.

NTT Photonics Laboratories is undertaking a wide range of research and development related to these goals and pursuing basic studies that lead the way in systems development. We also maintain close cooperation with other NTT laboratories as regards the development of practical devices with which to build the network system. Our goal is to develop photonic devices that will form the basis of the information-sharing society in the near future.

*Kazuhiro
Komatsu*

