Companies willing to challenge

A venture enterprise spun out of university

From electric signal to optical signal

A Tokyo University Spin-out Venture speeding up exploration of new market with world's top class next generation technology

Advanced Photonics, Inc. ［Ota-ku, Tokyo］

In Japan, there is a period of time called "Vacant 10 years". This refers to the time period after the burst of bubble when everything seemed to be stagnated.

However, industry-academy collaboration projects have been making steady progress with only a limited number of people noticing it. The University of Tokyo, the top ranking university in Japan, spearheaded such progress and gave birth to the companies specialized in research and development like the one that we are covering here.

The world's leading optical interconnection technology is poised to open a new market now.

Reporter: Hiroyuki Aino, Photographer: Tsutomu Suyama

Success in developing an innovative transmission technology to optically connect LSIs

On January 18,2007, the telephones in Advanced Photonics, Inc. never stopped ringing whole day.

At the end of the day, it was found that the number of calls amounted to about 200 and most of them were from IT or electronic appliances companies. This rush of calls was triggered by the article on the front page of Nikkei Business Daily that morning ,reporting the new technology which Advanced Photonics developed.

Then, what on earth is the technology whose development coveted so strongly by the world ?

" In a nutshell, it is a technology to connect LSIs by optical signal. Since the latter part of the 20th Century, optical communications technology has achieved significant advance and today virtually all transmission channels in major advanced countries are of optical type.

However, creation of optical transmission infrastructure has been only up to outside the buildings.

Inside of the buildings or inside of communications equipment, you can say that only electric signal is used. The technology we have developed may change such situations", says Prof. Yoshiaki Nakano, Advanced Photonics' external board member and its Supreme Technology Advisor. His explanations are somewhat modest for his achievement.

Prof. Nakano is concurrently a professor at the Research Center for Advanced Science and Technology.

Perhaps addition of a little more explanation may be appropriate. For higher-capacity and higher-speed data transmission, optical interconnection on PCB used in various electronic equipment and communications equipment is also required to replace conventional electrical interconnection.

Advanced Photonics' PCB mounted with OE-EO module, connecting LSIs on the board, was an answer at almost commercial level to this difficult task.

As at the time when the newspaper reporting was made, its transmission speed was three times as fast as the electrically interconnected PCBs. In addition, it had s simple design structure which facilitates mass production and brings about cost advantages.

Furthermore, it ensured high quality of transmission with lower power consumption.

Thus, it was no wonder that people in the related industries were all excited about the news.

Dr. Xueliang SONG, director and CTO of the company, led prototype production on the floor. According to Dr. SONG, further development has been progressing without much difficulty and they have "succeeded in 80 Giga bps transmission" (Giga means one billion).They are far ahead of the rest of the world.

Advanced Photonics expects such applications in high-capacity servers of communications companies.

At present, shipping of samples are being made to the leading electronic equipment manufacturers which made inquiries after they saw the articles on the newspaper. Prospects of commercialization are good.

Right thing to do for a spin-off from the University of Tokyo

As stated earlier, Advanced Photonics was born from research activities of the Nakano Office at the University of Tokyo. Dr. SONG, director and CTO of the company, as well as most of the employees are graduates of the Nakano Office.

Advanced Photonics is a representative example of challenges by spin-off ventures from the University of Tokyo.

It was around middle of 1990s that industry-academy collaboration in Japan started, and the University of Tokyo was among the first to respond to this trend.

First, the University of Tokyo began to think that the intellectual property (inventions) rights should be transferred to The University, rather than owned by individual scholar, and established a specialized company with personnel acquired both from inside and outside of The University.

Then, it examined thoroughly the accumulated fruits of research by the attending scholars and transferred the intellectual property rights overcoming various legal problems.

Next came an establishment of a venture capital. For this purpose, too, human resources were collected both from inside and outside of the university.

Independent of those specialized companies related with the university, the University of Tokyo Research Center for Advanced Science and Technology was set up in 1987 , collecting engineering and technology scholars. This institution inherited the business of Aeronautical Research Institute started in 1918.

It was in 2002 when Prof. Nakano moved to the University of Tokyo Research Center for Advanced

Science and Technology

It was just when venture companies were going to spring out from the University of Tokyo, and his engineering and technology research on optical communications was adopted as a program of projects in the University of Tokyo Research Center for Advanced Science and Technology. Mapping out of ideas for commercialization was started.

There were many problems to consider but the biggest issue was “What is the right thing to do for a university spin- off venture ?” .

“It does not make sense if a business to make use of the research results of public research organizations jeopardizes the existing markets. We thought our aim should be to create a business to open up new markets and bring about innovations to our society. This was an important principle to set the direction for our business”, says Prof. Nakano.

Actually there were research results on hand which seemed readily usable for immediate entrance to the markets and swift profit making, but commercialization of such projects were not adopted since they stuck to the principle of new market creation.

Mr. Takuro Wakabayashi, President & General Partner of Advanced Science and Technology Enterprise Corporation (ASTEC) and Mr. Hiroaki Nakai, also General Partner of ASTEC, exerted much influence in deepening their recognition of the principle while they were involved in the commercialization process as an incubation fund.

ASTEC itself was established only in 2001, and perhaps they were in the period when they tried to determine what sort of university spin-off is really worth investing.

After consideration of one and half year, they decided to invest Yen 30 million for incorporation of Advanced Photonics. Mr. Wakabayashi still holds the position of auditor there.

Expectation of a big shot in the arm for industrial world

Mr. Makoto Shigematsu, President & Chief Executive Officer of Advanced Photonics joined this project as a professional manager to take care of its business aspects.

His career includes experience of working in a research and development division of a leading glass manufacturer.

“ For a research & development type venture like ourselves, the utmost important thing is to maintain technological supremacy and to continuously take a lead. The immediate task is to make our products an industry standard”, says Mr. Shigematsu.

For this purpose, patents have already been obtained (The patent holder is the University of Tokyo and Advanced Photonics got exclusive license from The University), but in view of the brisk research and development activities by the big companies, Advanced Photonics further warms to its development efforts, aiming at higher performance.

The current target is development of an OE-EO module to enable transmission at the rate of as much as 240 Gbps.

Recently, the company passed the intermediate scrutiny by The New Energy and Industrial Technology Development Organization (NEDO) conducted at the third year after the subsidies were granted.

The company is in high reputation and expectations by those around it are also high.

Dr. SONG, Director & CTO, who leads its development efforts on the floor once considered working for big companies after he obtained his PhD at the Nakano Office. However, he finally decided to work in Advanced Photonics " because here I can pursue whatever technology development I want ,while there is no precedent and competition is worldwide" .

His place of work, however, is still the Nakano Office as before. The head office of the company is in Ota City Incubation Center, but for R&D activities they still live in lodgings at the Nakano Office.

His hard-working style serves as a stimulus to the postgraduate students belonging to the office.

Given the big success by the spin-out ventures from universities of Boston and Silicon Valley one after another, expectations are building up to venture companies from the universities in Japan as a big shot in the arm for giving momentum to its economy.

Advanced Photonics is likely to draw fervent stares from its surroundings for a while.

Technology staff of Advanced Photonics is consisted of the graduates from the Nakano Office. There are variety of nationalities including Japan, China and Malaysia.

R&D activities are carried on in collaboration with the Nakano Office.

Infiltration of light in electric communication

Long distance communication

FTTH

LAN

Intra-equipment interconnection

On PCB

Inside chip

Advanced Photonics' target area

Going optic

Limited to electricity

OE-EO module mounting board with two modules to convert electric signal to optical signal, connected by spiral embedded optical- waveguide.

Higher capacity data transmission was enabled compared with electric interconnection.

Company profile

Advanced Photonics, Inc.

Established: March 2006

President & CEO : Makoto Shigematsu

Head Office : 7-1-103 Haneda Asahi-cho, Ota-ku, Tokyo

Paid-in Capital : Yen 188 million

Lines of business: Developing, designing, manufacturing and selling high-capacity, high-speed optical PCB

Management of Advanced Photonics, Inc.

From left to right, Prof. Yoshiaki Nakano, Director & Supreme Technology Advisor, concurrently professor at the University of Tokyo Research Center for Advanced Science and Technology; Dr. Xueliang Song, Director & CTO; Mr. Makoto Shigematsu, President & CEO and Mr. Takuro Wakabayashi, Auditor.

Comments by the reporter

I asked Prof. Nakano what future vision he has as a scholar involved in business as well. His answer was : " I saw seeds in the field where there is no predecessor and grow it until a market is born. Then, I move onto another field. I have no intention to take advantage of a boom. When a boom starts, I leave the field".

This may be mission statement of Advanced Photonics, and at the same time he may be suggesting that he has another business start-up in mind which may take place before too long.