A founder and president of a leading global manufacturer of ophthalmic diagnostic products, refractive surgery lasers and other ophthalmic & optometric products, Hideo Ozawa’s business is vision.

But the term “visionary” might better describe his role at NIDEK Co., Ltd.

Even though the market for refractive surgery has been flat in recent years, Mr. Ozawa sees almost unlimited growth on the horizon. Noting that the average life expectancy has already reached 84 years in Japan, he predicts that it will reach 120 years by the end of this century.

And NIDEK wants to play a role in meeting the needs of that aging population. “We want to guarantee a good life for senior citizens,” he says.

With such an aging population, Mr. Ozawa sees tremendous growth in demand for advanced ophthalmic diagnostics and care — and in the basic technologies that will ultimately satisfy and further extend that demand. “Entirely new technology will be required to achieve a high quality of life for such a large population at such advanced ages,” Mr. Ozawa said.

A 50-year horizon

To meet such future needs, NIDEK is already investing in a wide range of technologies for eye care. But some of that research, particularly in tissue engineering, has broader medical applications. In keeping with his planning on a 50-year horizon, Mr. Ozawa sees NIDEK — with help from the company’s own tissue-engineering firm — as broadening its market focus.

Among the near-term technical breakthroughs to serve the ever-growing population, Mr. Ozawa sees multi-focal refractive surgery for presbyopia. “The concept is understood; it is a matter of refining it. This breakthrough alone could double the market for refractive surgery.”

Other refractive technologies Mr. Ozawa sees developing within the next few years are liquid crystal spectacle lenses to correct higher-order aberrations and continued development of accommodating contact lenses and IOLs. Here again, correcting presbyopia is a major goal, Mr. Ozawa notes.

Huge growth potential in China & Asia

Even without these technical advances, Mr. Ozawa sees global growth in refractive surgery, based largely on the potential of China and India. Earlier this year, NIDEK delivered its 1,000th excimer laser which was sent to China. In addition to his optimism about China and India, Mr. Ozawa says he is also optimistic about growth in Europe and North America.

Mr. Ozawa expects such a performance to help boost NIDEK’s worldwide sales. Those sales reached a record high of €241 million in 2000. A world-wide pull back in the refractive market, however, drove down sales to €211 million in 2001 and to €219 million in 2002, according to company reports.

A focus on research

Mr. Ozawa’s vision for NIDEK is based on a plan to build the company over the next 50 years with advanced technologies. The company is now making major investments to achieve that reality. “NIDEK is first and foremost a research company,” Mr. Ozawa says. “We have a long-term research pipeline.”

For instance, NIDEK is four years into a ten-year project to develop an artificial eye. The project is supported by the Japanese government and research centres around the country. Several electro-optical devices are being investigated that can be implanted to stimulate the retina, optic nerve and/or cerebral visual cortex, depending on the cause of the visual impairment. An artificial eye using a camera that transfers data directly to an implant in the brain is also under development.

The first goal is to restore light sensitivity. Later, Mr. Ozawa hopes that stereoscopic vision can be restored. He believes the devices will be ready for human trials by the end of the decade.

Culturing corneal and retinal tissue

In the longer term, Mr. Ozawa believes biological replacement corneas, retinas, and possibly even entire eyes could be cultured. Japan Tissue Engineering Co. Ltd., a company related to NIDEK, and which Mr. Ozawa founded, is well on its way to developing these. J-TEC, as the company is commonly known, has cultured skin and cartilage, and anticipates these will be ready for market by 2008. Regulatory approval is a big hurdle, he says. Mr. Ozawa projects annual sales of about €160 million on these items by 2014.

Mr. Ozawa believes this technology could be used to culture corneas, but technical difficulties remain. “The epithelium is easy to culture, but the stroma and endothelium are more difficult. But if we succeed we could do away with donors.” However, these developments are so far off that Mr. Ozawa makes no projection when they might materialize.

Diagnostic equipment is another area where Mr. Ozawa sees tremendous growth potential. He sees current ophthalmic instruments based on geometrical optics being supplanted by new, more precise, instruments based on wave and quantum optics. These instruments will be capable of measuring not only ocular configuration, but ocular function.

Plan for biophotonics

Another long-term technology initiative is biophotonics to detect the faint radiation emitted by living cells. A sufficiently sensitive camera could identify radiation associated with proteins or other compounds resulting from specific pathologies, potentially making it possible to diagnose infections, cancers, or other conditions without invasive studies.

These next-generation diagnostic tools will be smaller, integrated instruments that measure, record and integrate a variety of indicators from the anterior and posterior segment. “They will become ubiquitous in clinics and doctors’ offices.” Mr. Ozawa believes, making diagnosis much quicker and more reliable. The integrated information these instruments will supply will provide a more reliable basis for making surgical and other treatment decisions.

Integrating diagnosis and treatment

Already, NIDEK specializes in integrating diagnostic data with treatment tools. One of the major current products is the NAVEX Platform, which uses a computer and highly developed algorithms to link the NIDEK OPD-Scan — made up of an autorefractor, topographer, and wavefront analyser — with a microkeratome and excimer laser to perform wavefront guided custom ablations.

The NIDEK OPD-Scan provides accurate and comprehensive diagnostic information, including refractometry, keratometry, corneal topography, and wavefront analysis — all within one unit. This information is used to develop a custom ablation algorithm that directly controls the EC5000CXII excimer laser, resulting in precision results with no chance for transcription errors in setting up the laser.

Studies have shown that the new system reduces the volume of ablation by 20%, leading to more consistent outcomes and making it possible to treat higher-order aberrations, which is not possible with conventional LASIK systems. Directly linking diagnostic and treatment equipment also eliminates errors that may be introduced by transcribing settings manually. The NAVEX platform has also been successful in correcting vision in patients who had undergone a previous LASIK procedure with suboptimal outcomes.

More IT reduces costs

Eliminating manual transcriptions and incorporating advanced calculating capabilities into linked computer networks also reduces the time and level of training required by office staff to prep and treat patients. “The introduction of advanced IT is essential to cover the highly trained support staff’s job and to reduce costs to keep up with revenue decreases caused by insurance company reductions,” Mr. Ozawa said.

Mr. Ozawa sees the true value of IT coming from establishment of society-wide networks, which will make it possible to advance ophthalmology more quickly by allowing everyone to compare their results with central data bases and improve care processes based on the advancing experience of all providers.

Although NIDEK began its history in optical electronics, the potential of the technologies now under development has broadened and brightened its future, Mr. Ozawa notes. “Now, we are in the business of eye care. And we want to be the best in that business — from diagnostics to treatment.”