

corporate 2018



Message from the President

Working to Be a **Company That** Serves Our World **Better Than Ever**

Our universal value is to make our world better through the software we supply.

I believe our mission is to provide outstanding software and services that underpin the activities of manufacturing companies as they consistently produce exceptional products. This is how we can ensure that Zuken serves our world better than ever.

Facing an unprecedented tide of technological innovation, today's manufacturing companies are constantly striving to heighten their own unique advantage. Zuken will continue supporting these companies by providing cutting-edge IT solutions and outstanding consulting services within each individual customer's product development process. Rallying all our resources, we will boost our capabilities at both the organizational and individual levels so that we can fully address a wider range of needs than ever before. Above all, we will continue striving to be worthy of our role as our customers' partner for success.



Matototore

Makoto Kaneko President and Representative Director, Zuken Inc.

Our Value

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Invent



The Partner For Success

Manage

Resourcefulness & Integration Capability

Strong Financial Foundation



Design

Critical factors that will decide the



Realize

Global Development Network

Our Business

The Zuken Group Business Domains

Zuken Group

The Zuken Group supports the production capabilities of leading manufacturers by providing technology for automating electrical and electronic design, and a range of IT solutions and consulting services.

Zuken Inc.

ZUKEN

Zuken is a global provider of cutting-edge software and consulting services for electrical and electronic design and manufacturing. Our focus on R&D ensures customers maintain their competitive edge.

Electronic Design Automation

Since its establishment, Zuken's core business has been the development of the electronic design automation software needed to implement the advanced functions of today's ever-evolving electronics products. Zuken's software is now used by electronics manufacturers worldwide, together with our unique solutions for managing electronic components and design data based on extensive expertise in electronics design.

Zuken NetWave Inc.



Zuken NetWave sells and supports state-of-theart hardware and software for corporate networks, which are indispensable for today's business activities. These networks also include security and storage solutions.

Zuken PreSight Inc.

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PreSight

Zuken PreSight develops and markets creative

products that support the manufacturing industry,

including product lifecycle management (PLM)

systems based on technology that coordinates

lightweight 3D data and bill of materials (BOM).

It also provides knowledge management solutions

with a unique concept that reduces user burden.

DiverSync

DiverSync is devoted to planning and development of IT platforms to realize synchronized and bidirectional collaboration between design and manufacturing, which is the new normal in the age of the Internet of Things.









Zuken Tec Inc.

services that support a broad range of design and

development operations, including CAD installation,

startup, and operation.



Automotive and Machinery Design Solutions

Today's automobiles employ a range of electrical and electronic systems that are becoming ever more complex. Zuken develops and sells the electrical wire harness design software that is the linchpin of their development, as well as electrical and electronic control and design software for industrial machinery and equipment. From planning and design to production, Zuken software creates a collaborative environment for the supply chain of the automotive and machinery industries.

Zuken Elmic Inc.



Elmic

Zuken Elmic focuses on communication as the key element in technologies. It develops, sells, and provides support for middleware IP libraries. software, and related hardware for the embedded systems that support the security, industrial, and in-vehicle network fields.

DiverSync Corporation

Zuken Alfatech Inc.



Zuken Alfatech provides a variety of solutions and services primarily to customers in the mechatronics industry, including development, sales, and support for electrical CAD. It sells and customizes 2D/3D general-purpose mechanical CAD and CAE systems. As a new business area, Zuken Alfatech is also developing 3D modeling applications for the construction field, which is a domain with excellent potential.

History

A Steady Accumulation of Value

We continue to expand into new business fields and are pursuing an active partnership strategy.

Our CAD/CAM technology established an unshakable position amid growing demand for smaller, thinner, and lighter electronic devices.



Contributed to the miniaturization of electronic devices

In addition to a global sales network, our global R&D network is ready to capture best-in-class technologies from around the world.



Establishment of Zuken SOZO Center in 2013

Zuken opened the floodgates with Japan's first CAD/CAM system for PCB design in 1978.



Create 2000 at its launch

				2000s
	and the second second second			Mar. 2000 Zuken acquired all the shares of INCASES Engineering GmbH.
		19	990s	Mar. 2002 Started providing wire harness design software for the automotivindustry.
			Oct. 1991 Registered in the Second Sectio	Aug. 2002 Zuken (Shanghai) Technical Center Co., Ltd. was established in China
		2805	the Tokyo Stock Exchange as the electronic design automation (E corporation.	E first EDA) Feb. 2004 ePLM DS-2, a PLM solution special designed for the electrical and electronics industries announced
			Jan. 1992 Zuken Europe GmbH (now Zuke GmbH) established in Germany.	Aug. 2005 Zuken Taiwan Inc. established in Taiwan.
		Nov. 1983 Zuken America Inc. (now Zuken USA Inc.) established in California,	Jan. 1992 Zuken Korea Inc. established in Seoul.	May 2006 Zuken acquired Germany's CIM-TEAM (Now Zuken E3 GmbH
19	70s	Jan. 1988 CR-3000 (PWS), a printed circuit	Aug. 1992Zuken Singapore Pte. Ltd. establ in Singapore.	ished Jun. 2007 V54EE, a mechanical CAD system specially designed for the electro
	Dec 1976 Zukei Shori Gijutsu Kenkvusho Inc	board CAE/CAD/CAM network workstation, developed.	Apr. 1994 EDA vertical integration solution CR-5000 developed.	n industry, released. Jun. 2009 Enterprise PLM Presight released.
	Jun. 1978 Japan's first full scale CAD/CAM system		Jun. 1994 Zuken acquired all the shares o Racal-Redac Ltd. of the United Kingdom.	f
	circuit boards, developed.		Sep. 1994 Moved up to the First Section of Tokyo Stock Exchange.	f the
5				



The Design Engineering & Manufacturing Solutions Expo 2015

20	10s	
	May 2010	Zuken acquired a 14% share in Lattice Technology Co., Ltd.
	Jun. 2011	Visual BOM, a new generation engineering platform that merges bill of materials technology with the ultra lightweight 3D format XVL, released.
ve	Oct. 2011	CR-8000, a next- generation electronic device design platform, released globally. Design Force, which completed Zuken's system level electronics design environment, launched.
er	Sep. 2013	Zuken SOZO Center established in Silicon Valley, United States.
lly	Aug. 2014	Global Automotive and Transportation Competence Center established in Erlangen, Germany.
	Dec. 2014	Zuken and Toyo Business Engineering concluded an agreement on their capital and business alliance.
).	Feb. 2015	DiverSync Corporation established.
nics	Mar. 2015	Zuken India Private Limited established in India.
	Jul. 2015	Zuken took over YDC Corporation's CADVANCE business (CAD and PDM operations).
	Apr. 2016	Zuken split off its PreSight Division to establish Zuken PreSight Inc.
	Dec. 2017	Zuken acquired all issued shares of Alfatech Inc. and made it a subsidiary.
		Zuken Inc. Corporat

Global Network

Challenges in the Global Markets Accelerate Our Growth

Japan & Asia

Our head office is in Yokohama, the city where Zuken was founded. The head office oversees product and business development in Japan and worldwide.

The operating environment faced by manufacturing industries is increasingly global and borderless. Companies look to Asia as not only a manufacturing base, but as an important center for product development. We have therefore established subsidiaries in China, South Korea, Taiwan, Singapore, and India. We have built a system for accurately identifying the needs of customers in each region to offer the best possible solutions.

Americas

North America has many innovative companies that greatly influence manufacturing worldwide, and is also an important business development base for Zuken. In this market Zuken provides many leading U.S. high-tech companies with advanced solutions. In addition, to develop products and businesses for global markets, the Zuken SOZO Center promotes strategic partnerships with companies that own innovative technologies.

Europe

Zuken has a strong business foundation in Europe, a region that is home to many leading companies in global markets such as industrial machinery and automotive products. We complement our European sales network with bases that carry out core technology development. Our Global Automotive and Transportation Competence Center in Germany is part of Zuken's organization for developing next-generation automotive electronic and electrical design solutions for global markets.



Distribution of Personnel (As of the End of March 2018)



Global





- United Kingdom Zuken Ltd. (Zuken Technology Center) • Zuken Group Ltd.
 - Zuken UK Ltd.
 - Zuken GmbH (European Headquarters) ● Zuken E3 GmbH
 - Zuken E3 GmbH
 - Zuken GmbH (EMC Technology Center)
 - Zuken E3 GmbH Office Nord Zuken E3 GmbH (Global Automotive and Transportation Competence Center)
 - Zuken E3 GmbH Sp.z o.o
 - Zuken E3 GmbH, Zweigniederlassung
 - Ozuken S.A.
 - Ozuken Srl
 - Zuken GmbH, Sales Office Benelux

Financial Information

A Solid Financial Foundation

For the manufacturing industry, product development is an important, fundamental operation that determines future growth. Zuken provides solutions required for competitive product development. For us to support our customers' strategic product development and give them long-term confidence in our solutions, we must have solid financial foundations ourselves. Also, in the world of information technology, where technological innovation is intense, we must invest flexibly in order to continue providing cutting-edge technology in a timely manner. For this reason, since our founding, we have established and maintained a solid financial foundation as one of our most important management strategies. Operating income ratio 8.6% 69.0%



Total assets



Operating income



Shareholders' equity



Profit attributable to owners of parent



Dividends

Note: The 2016 dividend includes a commemorative dividend of 10 yen.



Current ratio

344.3%

Meeting the Challenges of Society

Creating Tomorrow, Leading into the Future

Artificial Intelligence Offers Answers for Design Challenges

Al in Zuken's Solutions

The capacity and reach of artificial intelligence has grown considerably in recent years, and applications of AI in society are gathering speed. In the field of manufacturing, the use of AI is expected to solve a number of issues, including technology transfer problems due to the aging of experienced personnel and human resource shortages. We at Zuken are also preparing to incorporate AI technology into our design support solutions in the electronics field.

AI Shows Huge Potential across a Number of Societal Contexts

The field of artificial intelligence has become a keen focus of interest, highlighted for instance when the computer program AlphaGo* defeated the world's leading human Go player two years ago. Al is not a new technology - it has existed since the mid-20th century - but it has now become easier to gather the vast amount of digital data that is necessary for learning, while the processing capacity of computers has also increased dramatically. In particular, this has resulted in great advancements in the field of machine learning. For example, in image recognition systems based on machine learning, it has been determined that discrimination capacity can exceed that of humans, and it has been demonstrated that AI has the ability to surpass human capacity in other cognitive tasks as well. Al is thus expected to find its way into various facets of society, such as improving work efficiency and contributing to problem solving. Zuken believes the incorporation of AI technology is indispensable for solutions development, and is collaborating with diverse partners on research in this area.

*An AI computer program developed by DeepMind Technologies Limited.

Importance of Selecting AI According to Objective

To gain more insight on the topic, we spoke to Professor Moritoshi Yasunaga at the University of Tsukuba's Integrated Systems Laboratory, which is providing Zuken with academic support on the use of AI. "The term AI gives the impression that it is one specific technology, but in reality there are many categories of Al. In addition to machine learning, which makes it possible for computers to replicate the kind of learning that comes naturally to humans, other AI research fields include pattern recognition, search and optimization, and natural language processing, each of which has considerable depth. Moreover, there are numerous methods to realize



Box 2 Application of Genetic Algorithms for Signal Waveform Learning



those technologies, such as with the neural network approach that imitates brain neurotransmission (e.g. deep learning), the evolutionary intelligence approach that imitates the process of evolution of organisms, and the swarm intelligence approach that imitates the activities of agents performing collective actions, such as ants." (See Box 1) In utilizing AI, it is important to have a full understanding of the characteristics of each realization method and to select the technology and approach that is most appropriate for the objective or problem to be solved.

Al in Electronics Design

Under the guidance of Professor Yasunaga, Zuken has been testing out various AI technologies and approaches, and is laying the groundwork to support efficiency improvement and problem solving in electronics design. For example, for predicting final printed circuit board size and cost at the initial stage of design, and for identifying the many false errors that are detected during design rule checking, we are promoting an approach of improving accuracy by applying the deep learning model for a large volume of existing design data and design rule checking data.



At the time of the second AI boom in the 1980s, Professor Yasunaga was researching semiconductor design technology at a major corporate research institute and was also working on AI technology, such as neural network integrated circuits. Back then, he came up against major stumbling blocks in areas such as large data collection and exception processing. He has drawn on those experiences in the most recent Al boom to propose practical and pragmatic methods of using Al.

Professor Moritoshi Yasunaga Graduate School of Systems and Information Engineering, University of Tsukuba





Using this mechanism, transmission lines are partitioned into segments, and each segment is coded for using a gene. While comparing output waveforms from a vast number of gene combinations with the supervisory signal waveforms, the transmission lines go through multiple generations undergoing three operations: 1) selection and elimination, 2) crossover, and 3) mutation. Optimization is achieved after thousands to tens of thousands of generations. It is possible to reach an optimal solution in a short time through the investment of computing resources, without the need for advanced or tacit knowledge.

 Selection and Elimination: Combinations with high-quality output waveforms are retained and those of low quality are eliminated. ver: Permutations mutually exchange a given volume of 2) Cross

nations at random cor

3) Mutation: Periodically, a completely different set of combinations are introduced nbinations go through multiple generations by repeating

However, as Professor Yasunaga points out, "Deep learning using neural networks is especially effective for image recognition, speech recognition, and pattern recognition, and is therefore ideal for applications such as inspection accuracy, estimation, and control. But it is not that useful in design applications for supporting solution search and optimization." He emphasizes the importance of selecting the AI technology and learning method that are most appropriate to the purpose. "For supporting electrical design itself, I believe that the genetic algorithm approach of evolutionary intelligence, which is an AI technology imitating the evolutionary process of organisms, will be more effective," Professor Yasunaga adds. "Actual examples of this effectiveness include wing design for aircraft and body design for automobiles, and most notably the body design of the N700 series of Shinkansen trains." An illustration of the academic support being provided to Zuken is the proposed application of such a genetic algorithm for designing printed circuit boards capable of maintaining high signal integrity. (See Box 2)

This opens up the possibility of performing advanced design work in an efficient and accurate manner with the use of AI, compared with the conventional approach of relying on the tacit knowledge of experienced personnel, and investing a great deal of time on design processes. Today's manufacturing workplace is faced with a number of challenges, such as technology transfer difficulties due to the aging of experienced and skilled personnel, and human resource shortages. AI may prove indispensable for solving those problems. Zuken will continue to proactively incorporate various AI technologies into its solutions to contribute to solving the problems of manufacturing, as well as to addressing social issues.

Creating Tomorrow, Leading into the Future

Commercializing the Innovative Technology of Startups

Zuken's Support for the Development of Retinal Scanning Laser Eyewear

Now that practical 3D printers have become more common and easy-to-use open-source hardware is available, the development of electronic products is no longer limited to major companies. The current environment enables smaller teams, and even individuals, to develop prototypes of original products if they have innovative ideas and the latest technology. However, unlike prototyping to test product functions and usability, achieving commercialization for a mass audience of undefined size calls for overcoming certain technical challenges. While major companies have abundant resources and experience, many startups lack full-time technology support groups and resources, so achieving commercialization remains a major hurdle.

Established Technology Helps Commercialize Novel Technology

Recently, startups and individuals have been harnessing original technology and ideas to introduce novel products. We are seeing products that create original experiences not only in completely new fields, but also in markets regarded as mature, such as cooking appliances. This new manufacturing trend, fueled by hardware startups and the organizations and individuals who constitute the "maker culture," has the potential to yield products that are unlikely to emerge from the product planning divisions of major companies, which generally focus on developing products for mass production.

However, activities that may be a matter of course for major companies could pose serious difficulties for many startups and individuals. For example, in order to bring a product to market, it must first satisfy tests and inspections related to compliance with safety standards. Achieving this is straightforward for companies with experienced teams of professionals; but for startups and individuals with limited resources, it can be a game-ender for commercialization plans. This translates into a loss for society. Zuken helps bridge this gap by using its technical resources and experience to support startups and individuals in turning their prototypes into marketable products.

One example is the support we provided to QD Laser, Inc., which develops, manufactures and sells highperformance semiconductor laser products. Their retinal scanning laser eyewear technology (See Box 1) uses proprietary advanced laser technology to improve visual acuity for people with moderate to severe visual impairment.

Contributing to Society Using Our Core Technologies

Living up to its motto, "Through light, the world is evolving," QD Laser has been working to refine the most advanced laser and optical technologies, including quantum dot laser technology. Industrial laser products have been the company's core business since its establishment. "We want to make a greater contribution to resolving social issues and advancing society with our semiconductor laser and light manipulation technologies," says Dr. Mitsuru Sugawara, QD Laser President and CEO. Based on that desire, in 2013 QD Laser started developing a medical device using retinal scanning technology for displaying images by projecting laser light onto the retina. (See Box 2) This retinal scanning laser eyewear was described as "a miracle in a pair of eyeglasses" by the judges at CEATEC Japan 2016. The product could not have been developed without QD Laser's advanced technology, but the developer faced a guandary in bringing it to market.



Box 2 New VISIRIUM Technology for Projecting Images Directly onto the Retina

Faint light from RGB laser light sources is projected onto a MEMS mirror oscillating at high speed, creating scan lines as on a CRT television display. These images are reflected by a second mirror and projected onto the retina.









Dr. Sugawara looks back on the difficulties: "In the development of medical devices, a product must pass a series of tests to ensure its safety before clinical trials; but our first prototype failed to sufficiently prevent the emission of electromagnetic interference, so it did not pass the EMI test. When facing this impasse, Mitsui & Co., Ltd., one of our shareholders, introduced us to Zuken Tec Inc., who helped us with EMI suppression for our product."



Dr. Mitsuru Sugawara (left), President and CEO of QD Laser, and Teppei Miyata (right), who provided technology support from Zuken Tec

Engineers working at hardware startups and as part of the maker culture – even technical specialists – often do not have expertise in the various testing requirements related to electrical design and product fine-tuning. Support from Zuken, which excels in this area, can help address these requirements, letting developers concentrate on their core responsibilities.

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We hope this product contributes to raising the quality of life for people with low vision.

Dr. Mitsuru Sugawara, President and CEO, QD Laser

Dr. Sugawara adds, "I realized that it is extremely important for us to achieve commercialization of our core technology by collaborating with other companies in areas outside our expertise, while taking on board as wide a range of technology and knowhow as possible."

Teppei Miyata, a Zuken Tec engineer who provided support for this project notes, "While working on this assignment, I came to understand and identify with QD Laser's enthusiasm for commercialization, and its mission to make this product available to those who need it as soon as possible. This motivated me to do all I could to help them secure medical device certification."

As a result of this and other experiences, Zuken is more committed than ever to collaborating with companies that want to contribute to the advancement of society through their technology.

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Company Name	Zuken Inc.
Foundation	December 17, 1976
Head Office Location	2-25-1, Edahigashi, Tsuzuki-ku, Yokohama, 224-8585 Japan
Paid-in Capital	JPY 10,117,065,000
Number of Employees	407 (consolidated: 1,267; as of the end of March 2018)
Stock Listing	Tokyo Stock Exchange, First Section
Business Areas	Research and development of a wide variety of software solutions that support the optimization of product design and engineering operations for manufacturing industries, and marketing of software solutions with expert consulting services.
Directors and Auditors	Makoto Kaneko, President and Representative Director Jinya Katsube, COO and Representative Director Kazuhiro Kariya, Managing Director Yoshikazu Soma, Managing Director Takeo Osawa, Director Koichi Saotome, Director Takashi Sano, Director * Yoichi Arai, Director * Fusao Wada, Full-time Audit & Supervisory Board Member Yasushi Ozaki, Audit & Supervisory Board Member * Takashi Handa, Audit & Supervisory Board Member *