

Making Bold Inroads into a New Business Area based on Core Technology

— With an eye toward the continuous stable management in the future, semiconductor-related business is combined with the life science-related business.



● Interviewer

Setsuo Iwashita
President & CEO, ULVAC, Inc.

● Guest

Dr. Stephen S. Schwartz
President & CEO
Brooks Automation, Inc.

Established in 1978, Brooks Automation, Inc., (headquartered in Chelmsford, Massachusetts, USA) has long focused on the robotization of the semiconductor manufacturing process. However, since the semiconductor industry is one of the most volatile industries, the company undertook the challenge of embarking on a new business area based on its core technology in 2010 with the aim of securing continuous stable management for the future. To this end, the company sold underperforming departments, implemented M&A in an aggressive manner using the proceeds from the sale, and successfully shifted its business to life sciences. Dr. Stephen S. Schwartz led this transformation process. He transferred from a leading semiconductor manufacturing company to become president of Brooks Automation, Inc., in 2010. President Setsuo Iwashita of ULVAC Technologies, Inc., invited Dr. Schwartz to the company based on his management philosophy and useful hints for successful M&A.

*All product trademark notices are omitted in this document.

Clearly define business strategies and aim to achieve stable management for the future

Iwashita: Brooks Automation, Inc., (hereinafter referred to as “Brooks”) and ULVAC, Inc. have built and long maintained a close business partnership. Moreover, Dr. Schwartz has provided me consultations not only on business management but also on personal affairs. Taking this opportunity, I would like to extend my sincere appreciation to him. I am excited to hear his views on various issues today. After 2010, Brooks shifted its business strategy and established two core businesses, namely, the semiconductor-related business and the life science-related business. We would like to know your views on how a company should be and how it can grow.

Schwartz: Indeed, we are focused on growth, and it has been an important objective for us during the past 8 years. As a company whose heritage is in serving the global semiconductor equipment market, we had been completely at the mercy of the semiconductor cycles. Of course, that means we benefitted during up-cycles, but we also suffered significantly in down periods which were particularly difficult as it meant significant cuts to cost and reductions of headcount. Against this backdrop, we struggled with the “sustainable” aspect of growth, as it seemed like we were driving a car with one foot on the accelerator, and one foot on the brake.

When we embarked on our transformation, we were intent on a path that would allow us to grow and to diminish our

dependence on the cyclical semiconductor business. In fact, we made sustainable growth such a priority, that we sold three of our semiconductor business units that we could not grow, and we used the proceeds from those divestitures to fund other growth initiatives.

Iwashita: Why did you choose life sciences and how did you ensure that employees understood the management policy?

Schwartz: We always work to be accountable to deliver on the commitments that we make to our customers, to the company, and to each other. The one thing that we try to do for employees is to articulate our strategy again and again. We believe that we are positioned and focused on market opportunities which are important to the world – in Life Sciences it is to support the research that will contribute to longer, healthier lives; and in Semiconductor it is to continue to improve the quality of our longer, healthier lives. We believe that these two areas will be worth pursuing for the next decades, and it is easy for our employees to be enthusiastic about our contribution to these important endeavors.

That said, the only thing that we promise employees is that they can expect hard work and change. Under various circumstances, this could be energizing or demoralizing, but we believe that as we have had success, and when employees are able see the fruits of their labor in the benefits to our customers, shareholders, and fellow employees, that we have tipped toward the “energizing” side of the ledger.

We have focused much of the past five years on Leadership Development. When we had only semiconductor products, we spent too much of our management time trying to keep up

with product demand during fast upswings in the market, and containing costs and managing headcount in the downturns. This use of energy was always internal to the company and did not provide much benefit to customers. With our diversification away from 100% front-end semiconductor, we have been determined to make management of cycles a part of our normal course of business, and we have worked to dedicate our management focus around our future, rather than just our daily challenges. Additionally, we have worked to create individual development plans for all of our employees to make sure that we can grow our next generation of leaders, whose job it will be to continue to grow the company in the future.

Flow map-based M&A with a focus on corporate culture and people

Iwashita: I hear that Brooks has actively implemented M&A to acquire new business. In this process, what challenges did you face?

Schwartz: One challenge for us is that we have been quite acquisitive over the past 7 years. When we complete our 2019 Fiscal year at the end of September, more than half of our approximately 3,000 global employees will have been with Brooks for less than two years. When we extend the timeline back to 2014, that fraction grows to more than 70% “new” employees. This is a challenge from the standpoint of culture, behavior, and stability. Our HR team has done a tremendous job getting these new employees and new companies on-boarded and integrated into our company processes and benefits plans. And our management team works extra hard to make sure that we are embedding our company values into all that we say and do so that new employees to Brooks can understand our corporate culture and accepted behaviors.

Also, change is always hard to keep up with, and it seems that we never quite communicate enough to reinforce the reasons for our changes and how the changes fit our general strategy. We can always do better, but we work at this every day.

Iwashita: For M&A, I understand that it is difficult to handle personnel issues and have your corporate culture take root among new employees. When Brooks implements M&A, do you have any criteria according to which you implement them?

Schwartz: We were fortunate to discover a new opportunity

where we could use our technology strengths, automation in controlled environments and cryogenics, to solve a global problem. We found that there are more than 2 billion biological samples stored around the world in freezers that have no automation, no precise method for tracking or locating samples, and no guarantee of sample temperature history or quality. The ability to manage and monitor the location, temperature, history, and permission to use a sample is critical to the value of the sample, and the ability of researcher to do high fidelity research. It was an obvious opportunity for us to bring value with our automation and cryogenics expertise to automate the cold storage of biosamples. We set out to learn as much as we could about the problems that resulted from mismanagement of cold samples and we created a Flow Map of what we called the Cold Chain of Condition. We outlined all of the process tools and process steps that we could envision that would bring value to the management of samples. From this Map, we charted a course for both acquisition and internal product development to be able to create an entire cold chain.

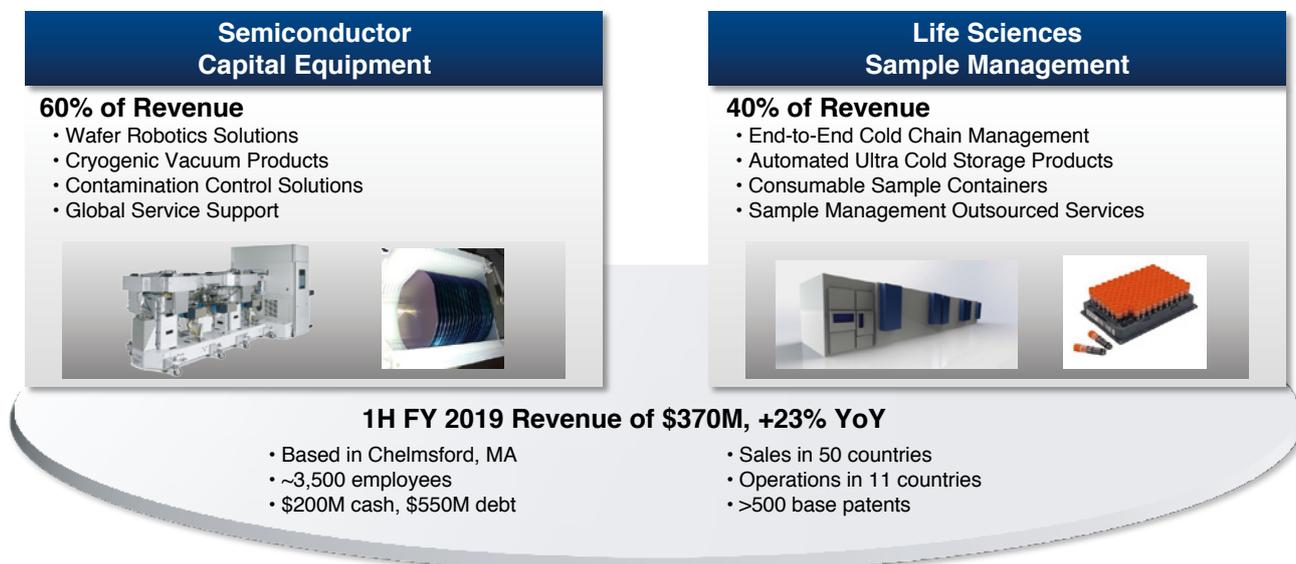
Iwashita: You mean that M&A is implemented based on the flow map of the cold chain. Would you explain the concept of the flow map?

Schwartz: As the saying goes, “no battle plan survives contact with the enemy”. In other words, we had a general idea of the types of capabilities to acquire and the names of many target companies, but an acquisition roadmap is rarely as simple as going directly from Point A, to Point B, to Point C. So, we generally adhered to our value map, but sometimes we did acquisitions out of the desired order, or we changed from one target company to another. We adapted many times, but we did not lose sight of our goal to create a high value Cold Chain for biological samples.

Also, our M&A criteria have evolved over the years. In the early days when we were entering the Life Sciences market, we looked to acquire market leading capabilities that satisfied our strategic roadmap. At that time, market leadership was very important. Of course, we had financial criteria to justify those acquisitions but at the start, we were most focused on acquiring a combination of those capabilities which were uniquely strategic in the creation of our Cold Chain Sample Management Solution.

For the past several years we have put more emphasis on specific financial hurdles for our acquisitions, in that we want the returns from the target businesses to be able to exceed our cost of

Fig.1 Brooks Automation at a glance – 1H FY 2019



capital within a reasonable time horizon – typically this is three years for a semiconductor business acquisition, and we allow up to five years for a Life Sciences acquisition.

Of course, any M&A that we do must be with a company that is a good cultural fit with Brooks and a company that we can continue to grow.

Aiming at further development by investing profits in sales in the new third area

Iwashita: Brooks and ULVAC had managed ULVAC Cryogenics Incorporated, which develops and manufactures cryogenic pumps as a joint venture. However, Brooks sold the related department and withdrew from the undertaking. Please tell us about the reasons why you sold it.

Schwartz: I can imagine that this decision might look curious to ULVAC, especially since it is a core business that has high market share and has performed very well. Actually, this was a decision that we made over a period of years. Our original plan was to expand our growth in the cryogenic vacuum space. We performed a strategic market assessment to examine different growth opportunities which were outside of our current semiconductor and related applications. And though we were very positive about the growth opportunities in and around the vacuum technology space, a small company like Brooks could not justify investing simultaneously in three areas – semiconductor automation, life sciences, and vacuum technology, so we decided to focus on automation and life sciences.

We decided that if we were not going to invest in cryogenics, we did not want the business to languish or to suffer share loss from lack of investment, so we decided to run a sale process to see if we could receive a sales price that was fair for the business, from a buyer who would keep the cryopump business unit together. We were fortunate to satisfy both of those criteria and we agreed to the sale to Atlas Copco. We plan to use the proceeds from the sale to continue to invest in both of our remaining businesses.

Our strengths lie in engineering technology and talented people

Iwashita: Brooks established a solid foundation to maintain stable business for the next 10 or 20 years by executing a brave change of direction. Where do you think the advantages of the shift, such as synergy in business, lie?

Schwartz: I would say that the synergy between our Engineering and Science capabilities of Automation and Cryogenics has been of tremendous value to us. At our core, we are an innovative engineering company. Engineering is our heritage and what we have been known for for the last 40 years. We are fortunate to have found an opportunity where automation in ultra-cold environments can benefit the Life Sciences discovery market. When presented with this new challenge, I believe



Profile of Dr. Stephen S. Schwartz
 President & CEO
 Brooks Automation, Inc.

Birth date: October 24, 1959

<Brief Background>

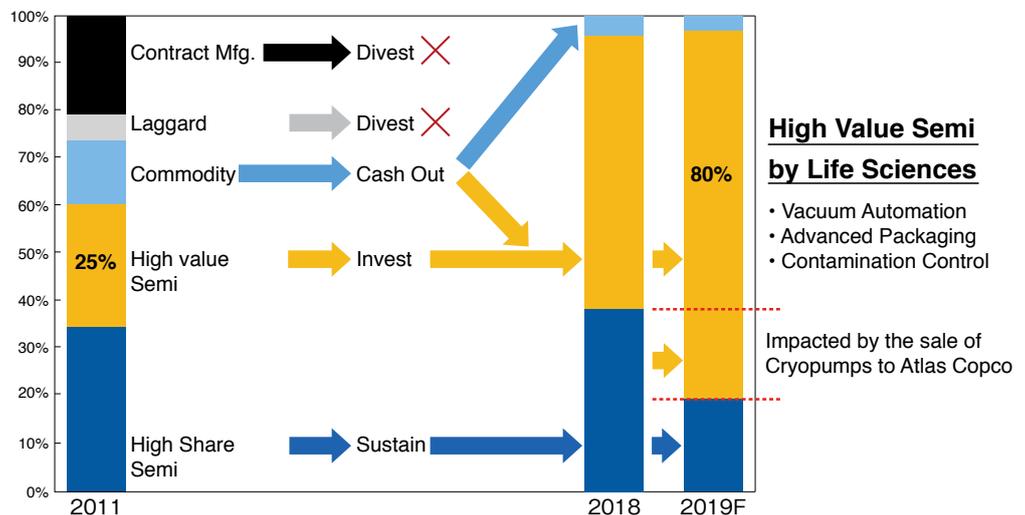
- June 1987: Joined Applied Materials, Inc., Santa Clara, California - General Manager, High Temperature Films Division
- January 1994: Moved to Applied Materials Japan, Chiba Prefecture, to manage the Global HTF Division from Japan for one year.
- June 1997: VP and GM of Applied Materials Global Service Business
- June 1999: President of Consilium, an Applied Materials Company
- January 2001: Asyst Technologies – SVP in Operations
- August 2002: Appointed CEO of Asyst Technologies
- October 2002: Appointed chairman and CEO of Asyst Technologies
- April 2010: Joined Brooks Automation, Inc. as President
- October 2010: Appointed president and CEO of Brooks Automation, Inc.

Corporate Profile Brooks Automation, Inc.

Business: a leading worldwide provider of automation, vacuum, and instrumentation solutions for multiple markets including semiconductor manufacturing, life sciences, and clean energy.

Founded: 1978
 Headquarters: Chelmsford, Massachusetts, United States
 President and CEO: Dr. Stephen S. Schwartz
 Number of employees: 3,500 (2019FY)
 Website: www.brooks.com

Fig.2 We went to work...



our team responded extremely well and collaboratively to devise methods to make our automation work at cryogenic temperatures, and to keep samples cold when applying power to move the automation.

Another advantage we have relates to our human resources. We have found that when we are innovative and when we execute at the leading edge of technology, we are able to attract top talented people who are eager to join us to solve some very challenging problems. It is energizing for these employees, and they attract people who are also drawn to these challenges.

I also think that our geographic footprint is an advantage. We operate globally, and we have product development on the East and West Coasts of the U.S., China, U.K., Germany, Korea, and Japan. It allows us to attract very talented people and to give international assignment opportunities to our employees – something very important for our future.

Strengths and weaknesses of Japanese companies in terms of globalization

Iwashita: We envy you. True globalization is a major theme for the future of ULVAC. We would like to know the details of the global business development of Brooks, our predecessor.

Schwartz: We are fortunate that the global markets provide so much opportunity for growth, collaboration, and expansion of our businesses. There is much in the news these days about trade friction and restrictions, but still, for much of the last 50 years this has been a period of the most robust global trade and open markets that we have ever seen. Of course, the ability to compete in different regions requires knowledge of customers, business practices, and regulations, but we have found that the challenges are worth the investment and we are encouraged to continue to build our business in growth regions.

This has always been important, but never more than today, when global mobility is high and trade opportunities are expanding. I personally believe that globalization and the connectivity that exists today has helped all of us to have the opportunity to better understand cultural differences. Younger people especially seem to be more globally fluid than in the past and this trend

seems to be increasing.

All of us are the beneficiaries of a more diverse work community.

Iwashita: In that case, I think that Japanese companies are in a difficult position. What do you think are the strengths and weaknesses of Japanese companies in terms of globalization?

Schwartz: Ah, indeed this is a tough question for someone who is not Japanese, but I will give some of my observations/impressions. My comments are also from the perspective of only having worked for US-based companies.

First, in terms of advantages for Japanese companies. I would say that teamwork and alignment of employees around the company objectives seems to be strong. This is a tremendous asset when tackling big challenges.

Second, stability of the workforce is a plus and seems dependable as there is a trust bond that exists and can be built upon.

Third, there seems always to be a culture of quality and adherence to rules and process is commendable and something that permeates market perception about the quality of Japanese products and services.

On the flip side, and this comment is neither an advantage nor a disadvantage, but rather a difference historically between Japanese and American companies. Often, American companies worked to move quickly to develop a product. The process would consist of try, fail, make a change and try again, fail again, etc. Japanese companies tended to take more time to plan, align completely, and then execute to deliver a more finished product. I believe that what is often the case is that somewhere between these two methods there may be an even better way to innovate and deliver high quality products more quickly.

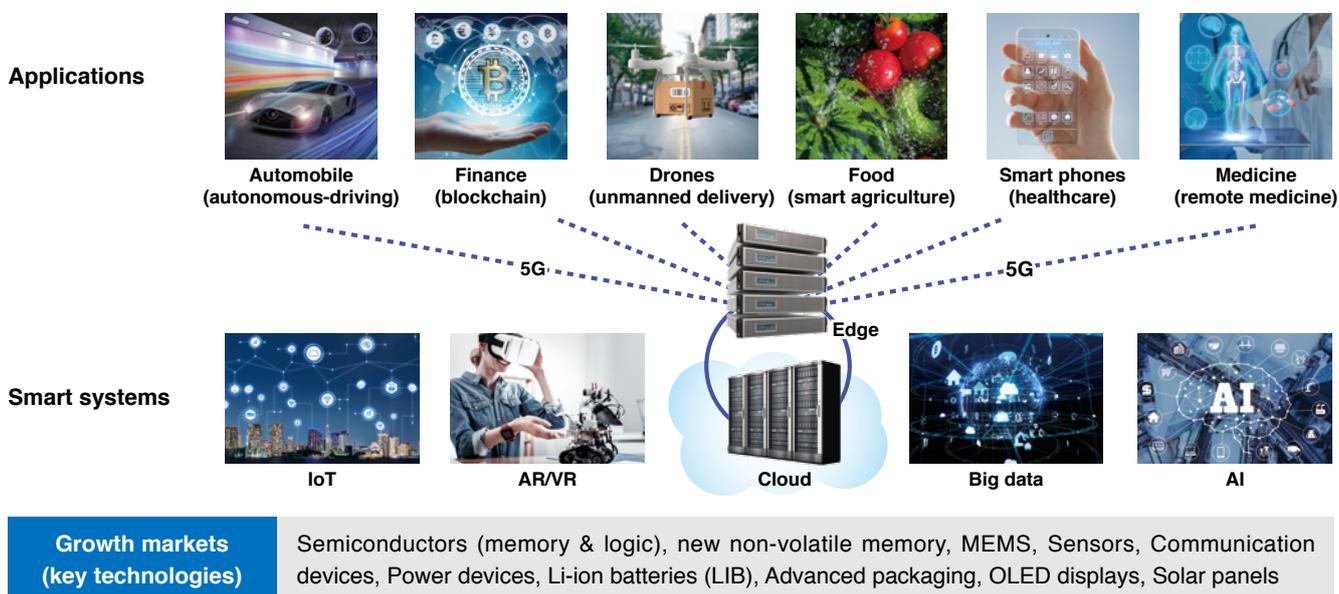
Also, sometimes Japanese companies have been slower or more reluctant to expand outside of Japan.

Vacuum technology will become increasingly more important

Iwashita: Please tell us about the future prospects of Brooks.

Schwartz: We are always looking to the future and we are positive about the prospects that are provided by the markets we serve. In semiconductor, our challenges relate to our ability to stay in front of technology needs of some very big companies

Fig.3 ULVAC's Technology for enabling a smart society = Growth market



that are getting larger in a rapidly consolidating industry. Size and scale and the ability to develop products quickly will be paramount to success. Our ability to collaborate and to consider alliances with partners will be key.

From a technology standpoint, we see a significant trend in both our Semiconductor and Life Sciences business to lower levels of contamination. For certain, this is accomplished in our semiconductor automation business by the increased number of process steps that are performed under vacuum. Contamination control these days is no longer simply the application of highly purified air, but rather it now includes the vacuum reduction of airborne molecular contamination (AMC). Over the next generations of device technology, we see vacuum technology playing an increasingly valuable role in yield enhancement as well as advanced process technologies. Without question, the vacuum process share of the Wafer Fabrication Equipment Market and the Display Markets is growing faster than the overall market opportunity.

In Life Sciences, the size of the opportunity is clearer than our roadmap. The life sciences market feels much like the semiconductor field was in 1980 – much invention and innovation, very few standards, limited automation, and seemingly unlimited room for experimentation and discovery. We very much want to be a part of this boom and we are looking for ways to continue to grow where we can add value to the research that is changing seemingly on a daily basis. We are still in the earliest innings of this long game.

So, we are positive about the outlook for our markets, and we are somewhat paranoid that we are not the only company who can see these opportunities – that keeps us energized, a bit scared, and definitely working harder to make sure that we can capture these opportunities.

Looking at future collaboration with ULVAC

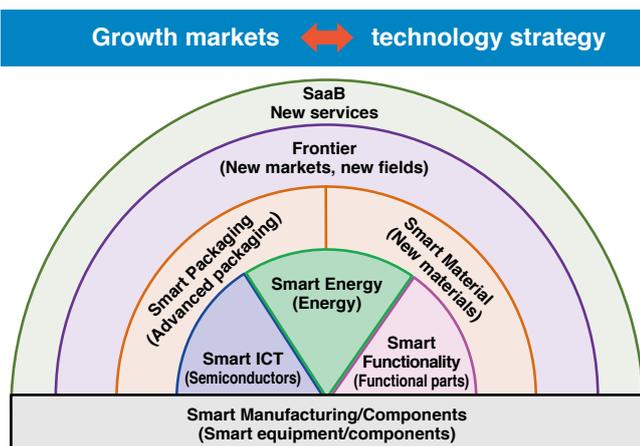
Iwashita: Dr. Schwartz, what type of company do you think ULVAC is? How do you evaluate the company?

Schwartz: ULVAC has many assets, but three immediately come to my mind.

Number 1, ULVAC has a strong and dependable brand and an excellent reputation for superior vacuum technology and dependable products. You are leaders in your markets.

Number 2, Your global capability in terms of breadth and balance is admirable – especially your footprint and presence

Fig.4 Creating growth markets (key technologies): ULVAC's technology strategy



Setsuo Iwashita,
President & CEO,
ULVAC, Inc.

across Asia – particularly your presence in Japan and China, which is formidable.

Number 3, You aggressively invest in R&D and you are applying growth capital to secure your positions.

The combination of these factors and your position in growing markets gives much potential opportunity which other companies cannot easily overcome.

I admit that I am not well-equipped to know disadvantages, but I would suspect that the North American market is one that likely presents an untapped opportunity for ULVAC.

Finally, it is my personal observation, I believe the fact that Iwashita san, as the top leader in the company, is always asking this question - about things that ULVAC can and should do better - is a big advantage for ULVAC as it is this kind of thinking and probing that leads to improvement and new opportunities.

Iwashita: Thank you for your nice comment on ULVAC (laughter).

The ULVAC Group will join forces with one another to contribute to the resolution of global social issues. We think that a smart society can be achieved by electronizing all industries, including medicine, agriculture, information and communications, and energy. To this end, the ULVAC Group is determined to contribute to the world by leveraging its long-accumulated experience and collective strengths in the fields of thin-film technology, device element technology, and material technology as key means. We believe that this is the value of ULVAC. This is only my idea, but I hope that Brooks and ULVAC will further collaborate with each other for the future of both companies.

Schwartz: Through UCI, our Joint Venture company between ULVAC and Brooks, we have a history of cooperation of more than 30 years. I admit that though our relationship has been one of good cooperation, it has not been one of good collaboration. I believe that we missed a real opportunity to take better advantage of our two strong teams to create even more success for our companies. This was a failure of mine to recognize a larger chance through closer collaboration. So, I would welcome a chance to think about more chances to collaborate with ULVAC in the future.

Iwashita: We would be delighted to collaborate with Brooks and ask for your continued support and cooperation. Thank you for sharing your useful and helpful ideas with us today.