

Team OSAKA Sweeps RoboCup 2004-06

– The Track Record –

By Akazawa Yohei

Photo: Systec Akazawa Co.



Akazawa Yohei, president of Systec Akazawa Co., has become a manager of robot developer group "Team OSAKA" seeking to help revitalize his hometown Osaka.

The RoboCup is an international project whose ultimate goal is to develop by 2050 a team of fully autonomous humanoid robots capable of winning over the most recent human World Cup soccer championship winner. A team from Osaka, representing Japan, won the RoboCup Humanoid League competition in 2006 for a third consecutive year. The winner, Team OSAKA, is a consortium formed through industry-academia-government collaboration. I will describe below how Osaka City has been engaged in robot development and what impact it has had on the region.

■ Osaka Robotic Initiative

The Osaka municipal government set up a council at its Economic Affairs Bureau in June 2000 to blueprint an economic vision. The city had grown

on the basis of manufacturing, but its industrial base was being undermined as many production sites for machines and textiles were being transferred to China in the wake of its economic emergence. Osaka was then under pressure to sophisticate its industrial structure.

The Osaka city government adopted the idea of "creating an international city attracting visitors" as a specific plan. Its concept was to create small and medium companies capable of starting new businesses, seizing on the magnetic power of attracting visitors as a business. The city would publicize such achievements at home and abroad, resulting in further expansion of the number of visitors. In December 2002, the city came up with an "Osaka City robotic industrialization project initiative" after intensively discussing whether it is possible to create a new cycle based on the keyword of "visitor attraction."

■ Team OSAKA Spawned

Coincidentally, my company, Systec Akazawa, was then facing a turning point. The firm originally started from processing parts of freight trains and shifted to manufacturing parts of electric trains, Shinkansen bullet trains and aircraft along with the trends of the times. But demand for aircraft declined after the Sept. 11, 2001 terrorist attacks on the United States and the subsequent Iraq war. The situation was so critical that we had to seek an alternative business. Then, the Osaka municipal government invited us to join a city-subsidized project to establish a robot team representing Osaka City.

I always think that "only after manufacturers around us become busy, our company will become busy." To make a robot, 30 body components and 23 motors are needed. For mass production, metalworking, plating, pressing and many other helping hands are required. I decided to participate in the

project, feeling certain that it would vitalize the manufacturing sector in Osaka.

My company applied for the team representing the city along with two other venture businesses. The three firms were chosen out of applicants by the city. Team OSAKA was established with the participation of other people, including researchers from Osaka University. I became manager of the team. Ten months later, Team OSAKA produced "VisiON," a fully autonomous bipedal humanoid robot. Unlike robots controlled from outside, the autonomous robot can make its own decision on its movement such as kicking a ball and standing up after falling down, based on information from an omnidirectional sensor on its head.

■ Better-Than-Expected Outcome

To determine whether VisiON can compete on the world stage, we took part in the Humanoid League of the RoboCup 2004 world competition held in Lisbon, Portugal. Although it was the first participation ever, our team unexpectedly won after clearing all four designated categories. We were extremely delighted because winning the event that draws attention from researchers around the world meant the capability of Osaka's manufacturing sector was recognized in the world.

The victory invited a rush of inquiries from around the world. Staging the RoboCup in Osaka was one of the city's eventual objectives, and it was realized in 2005. For the event, we





Akazawa Robots Clinic has two departments to support "patients" (robots): "general remedy" (repair) and "rehabilitation" (improvement).



Autonomous bipedal robot "Robovie-M" is examined by a "robo-doctor."



"PLEN" can glide smoothly with a pair of roller skates.

introduced an improved humanoid robot named "VisiON NEXTA," which had a response speed of autonomous motion eight times quicker than its predecessor, VisiON, and won the competition for a second straight year.

In RoboCup 2006 held in Bremen, Germany, the team's advanced "VisiON TRYZ" earned the highest marks, winning the third successive championship.

The project, launched with the aim of making Osaka a "robotic town," has achieved a far greater result than expected and the achievement has brought rays of hope for manufacturers in Osaka. And the Ministry of Economy, Trade and Industry unveiled a robotic industry development initiative, projecting that the

industry will grow to ¥1.8 trillion in 2010. I could not imagine just a few years ago that small and medium manufacturing companies would be involved in robot development. Their commitment has been taking shape day by day and I cannot but feel it is paying off.

Robot / Human Soccer Match

Systec Akazawa's sales related to robots increased from ¥3.8 million in 2004 to ¥29 million in 2005 and to ¥58 million in 2006, up 15.2 times in three years. The company has dealt with a variety of parts in Japan's postwar economic growth, but there has been no such exploding business. We put on sale the "PLEN" robot in August 2006 based on the concept of a "desktop hobby robot" in hopes that people would feel familiar with robots.

At the same time, we established a hospital exclusively for robots on the market for repairing and upgrading, called "Akazawa Robots Clinic." We have found that although a variety of

humanoid robots have gone on sale in the past, lots of them are left idle after breaking down. The clinic was reported on by many newspapers and TV programs immediately after its opening and many robots have been brought to the clinic. I am surprised at the excellent response.

But neither Systec Akazawa nor Team OSAKA was particularly superior to others. As for VisiON and other robotic technologies, they were completed after putting together the most advanced elemental technologies in Osaka. They are a culmination of technologies of all those involved in manufacturing. Robots will increasingly evolve in the future and the day will undoubtedly come when a humanoid robot team will face a human soccer team. Systec Akazawa will seek to advance as before so that we will be able to watch such a game as soon as possible together with people around the world. **JS**

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VisiON, a fully autonomous bipedal humanoid robot, won the 2004 RoboCup competition.