



MITSUHIKO YAMASHITA
Executive Vice President

Pursuing Value Through Technological Excellence

"I have two prime objectives. The first is to realize our corporate vision, 'Enriching people's lives,' from an engineering standpoint. The second is to create a future vision for people working in R&D. Research and development is all about providing practical value to the customer via technological excellence, which in turn creates value for our shareholders. Nissan has made a major commitment to technological excellence so that we can accomplish these objectives.

Research and Development

Nissan's investment in R&D has been rising. In fiscal 2004 we devoted approximately ¥400 billion to it, equivalent to 4.6 percent of our turnover. We estimate that our financial commitment to R&D will continue to range between 4.5 and 5 percent. R&D investments take a lot of time to pay off, of course, so it's difficult to evaluate our evolution over the short term. Given our expanded output, however, I believe that we are headed in the right direction.

For example, the number of patents we have generated is growing quickly, exceeding 4,000 in fiscal 2003—more than twice the fiscal 1999 figure. And the number of research papers we present at societies such as The Japan Society of Mechanical Engineers rose dramatically in fiscal 2004. These are direct results of our commitment to research. We are also generating more new technologies related to safety and the environment, such as the Around View Monitor and the lane-keeping system.

We have succeeded in shortening our production pipeline, too, using a new vehicle development process called V3P that our engineers devised over the past three years. V3P, which stands for Value-up innovation of Product, Process, and Program, has helped us cut our development time almost in half, from 20 months to just 10.5 months. I believe this makes Nissan the world benchmark in development. That improvement is having a major effect on the flexibility and execution of R&D at Nissan, and will ultimately boost the company's profitability.

The number of new products we have brought to market over the past three years is equally significant—more than thirty new vehicles. That's an impressive engineering achievement, and the reason you are seeing so many new Nissan models on the road.

Our R&D infrastructure, however, is still in need of expansion. We've therefore begun building new facilities at the Nissan Technical Center, NTC, and at the Nissan Advanced Technical Center, NATC, both of which are in Japan. These additions represent a major investment, and show Nissan's dedication to maintaining and enhancing its technological skills.

Our technology base is in Japan, where we have some ten thousand people involved in R&D, but we also have two major centers in North America and Europe, and smaller operations in Taiwan, China, Thailand, South Africa and Brazil. In the past, these entities were mostly standalone operations, but today there are many more joint projects



Rear active steering



Intelligent cruise control



Shock-absorbing body, to reduce pedestrian injuries

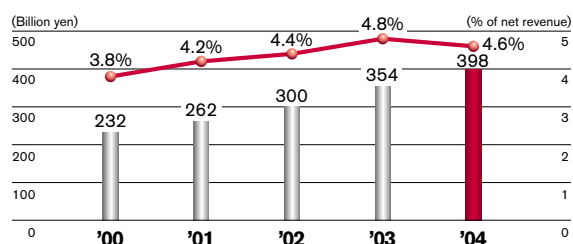


and much more collaboration. The core engineering is common to all—that's why the different organizations can work together so closely, and why we're more efficient today. While each engineering center remains responsible for meeting the specific tastes or specifications that its local market demands, we have global oversight to ensure consistency, with NATC supervising overall resource management and facility investment.

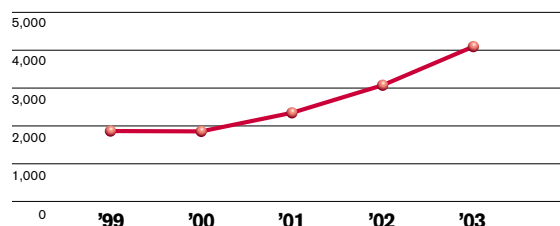
We are building on these strengths through greater collaboration with our suppliers—our project partners—and doing it much further upstream. For example, we are creating a facility at the NATC where we can disclose our plans to suppliers during the very early planning stages. This means we have to be much more open than before, but in return we will gain a great deal from the ideas our partners bring.

The Alliance with Renault is another major strength for Nissan R&D. We identify areas of mutual interest and decide which party will develop specific projects. Our basic operating principle is to avoid duplicated efforts. We can work separately, or together if there is mutual interest in the development. For example, we have studied fuel-cell vehicles—FCVs—as well as, advanced materials, safety, and other areas together. Our shared goal is to maximize the benefits so we will rank among the top three entities in technology worldwide.

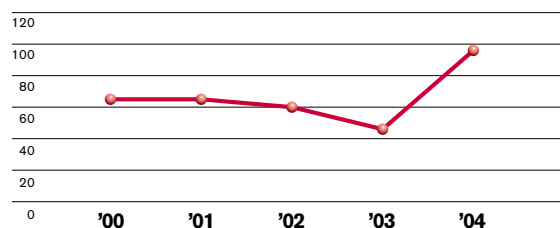
R&D Investment



Patent



Research Paper



The number of research papers presented at JSME (The Japan Society of Mechanical Engineers), JSAE (The Society of Automotive Engineers of Japan), SAE (The Society of Automotive Engineers), FISITA (The International Federation of Automotive Engineering Societies)



Testing at Nissan Advanced Crash Laboratory



CARWINGS telematics system



Aluminum parts

Safety

In the area of safety, we have established Vision Zero, the goal of which is to reduce the number of fatal accidents to zero. As a reference point, we are using the number of such accidents in 1995 that involved Nissan vehicles. We realize that accidents cannot be completely avoided, so our objective is to be substantially zero in the future. To achieve this, we have set a series of milestones, including cutting the 1995 fatal accident figure in half by 2015.

Interestingly, while the number of fatal ones is decreasing, the number of all accidents in Japan is increasing. Our first goal is to decrease the overall accident count, which should further reduce the number of fatalities. Several factors contribute to accidents, including driver inexperience and higher speeds. Based on these factors, we came up with the approach of Safety Shield. Safety Shield establishes a timeline for the entire accident, covering the safe driving zone, the moment before the accident, the actual crash, the response time by authorities, and the time taken for post-accident rescue.

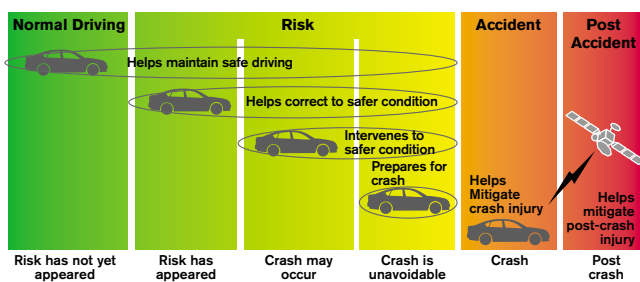
In the past, safety technology primarily focused on dealing with damage in and around the vehicle, such as airbags, body structure design, seatbelts and crumple zones. Now we are studying normal driving conditions and researching how we can keep car and driver in the safe driving zone. In cases where the driving environment becomes unsafe, some type of warning would usually help the driver to return to the safe driving zone. A driver actually in danger has probably lost control of the car. In the latter

cases, we must focus on safety technologies that prompt the vehicle itself to automatically assist the driver. An example of this is Nissan's Lane Departure Prevention system or brake assist: When the vehicle approaches the lane markers, this system not only warns the driver to pay attention through a display and an audible buzzer, it also generates part of the necessary yaw movement needed to return the vehicle to its lane and safety.

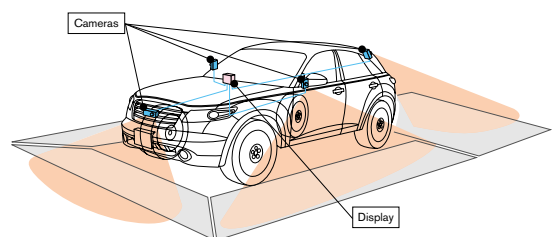
Another Nissan safety innovation is the Around View Monitor. This system offers a 360-degree view on a dashboard display of what is around the vehicle. In addition to significantly reducing the blind spots in driving, the Around View Monitor is helpful when parking, since it improves the driver's field of vision and enables better maneuverability.

In developing safety technologies, we also look at the conditions that exist seconds before an unavoidable crash. With this information, we can provide technologies to minimize the impact and damage in addition to notifying the authorities and calling for assistance afterward. Because we are building on actual accident data, the final stage in the Safety Shield involves collecting and analyzing the data and feeding what we learn back into the development process. We have committed ourselves to introducing over ten new safety technologies during the next three years, spanning the entire driving range from the safe driving zone to the actual crash.

For more on safety at Nissan, please see the *2005 Nissan Sustainability Report*



Safety Shield—concept image



Around View Monitor



Altima Hybrid



Sentra CA (USA)

The Environment

We have extended the Vision Zero concept to our work on environmental technologies. In the area of emissions, for example, we are investigating CO₂ and other substances with an environmental impact, either indirect or direct. Nissan's goal is simple: zero emissions. The primary focus for us has been CO₂ reduction, and we have been quite successful in this area.

Nissan is developing new hybrid technology as well. However, we do not believe this technology is sufficiently mature enough yet for wide application in the market. It would be easy to sell 1,000 or 10,000 cars, but that is neither an effective solution for the environment nor a financially viable proposition for a manufacturer.

Nissan's greatest strength is in current technologies such as the CVT, or continuously variable transmission. The CVT is a low-cost, advanced technology that can be applied to all types of vehicles to significantly and immediately reduce CO₂ emissions. In comparison to a hybrid electric vehicle, or HEV, a CVT-equipped car reduces CO₂ emissions by 20 percent. So if we sell five CVT-equipped vehicles, the effect would be the same as selling one hybrid car. Our current plan is to sell a million CVT vehicles, which would be equivalent to 200,000 HEVs—a significant figure.

We have to meet certain CO₂ emission levels. The first pillar in our efforts is to develop strong future technologies. To do this, Nissan must have a clear, precise vision of the future. We have come up with a number of specific scenarios for the next 40 or 50 years and considered the

technologies we will need to introduce to meet that vision. Over the next two decades we will significantly improve gasoline and diesel engines, which is where we can make an immediate impact. We are currently developing the next generation of gasoline HEVs. The generation after that will be diesel HEVs, which have even lower CO₂ emissions than gas-powered HEVs. The next step will be FCVs and pure electric vehicles. Nissan is actively working to further the diffusion of the fuel-cell stack we've developed in-house.

At the same time, we are taking a practical, proactive approach to the environment. We want to do good rather than just look good. The second pillar is to consider how we can actually introduce these new technologies to the world market. Advanced but expensive technology can't be applied on smaller, more economical cars, which are the cars most of us drive.

In the meantime, we have already had some notable successes in the environmental area. The Nissan Sentra CA, for example, was certified as the cleanest gasoline-powered car in the world, and our Bluebird Sylphy was recognized as the first-ever SU-LEV, or super-ultra-low emission vehicle. We are proud of these successes, but we are focusing on even more significant emissions reductions and fuel economy, continuing to develop advanced technologies that will bring us to our Vision Zero goal."

For more on environment at Nissan, please see the *2005 Nissan Sustainability Report*



X-TRAIL FCV



Nissan-original fuel cell stack



Continuously Variable Transmission (CVT)
CVT (Continuously Variable Transmission) enables a smooth, continuous transmission which not only enhances acceleration, but which also improves fuel economy for better environmental performance