

## Highlights of Technology Briefing

July 2, 2003

### Summary of President Hasegawa's Comments

In April 2002, Yamaha Motor initiated a new three-year medium-term management plan, NEXT 50. With this plan, the Company aims to create a stronger management foundation ahead of the 50th anniversary of the Company's establishment in July 2005. In order to achieve further growth in the next half century, the Company is aggressively promoting a technology development strategy. It is designed to hone Yamaha Motor's competitive edge in existing products, while establishing the foundation of new businesses which will become an integral part of the Company's profits in the future.

### Direction of Technology Development

Yamaha Motor aims to set itself apart in the 21st century as a *Kando*-creating company. True to this mission, NEXT 50 refers to the slogan "Touching Your Heart" to describe the concept of "exceptional excitement" that the Company seeks to deliver to its customers. Meanwhile, Yamaha Motor also has a mission for its global environmental preservation activities. The Company operates under three basic principles: (1) keeping the air clean; (2) keeping water clean; (3) keeping the soil clean. With these principles, the Company will launch the following technology development projects, pursuing two themes that may seem contradictory, yet which exist best in harmony: environmental preservation and the excitement - the *Kando* - that Yamaha Motor products create.

- In existing business areas, the Company will focus on both conventional power sources, including various engines, and new power sources - *Smart Power* - such as electric power, hybrid power and fuel cells, as well as component systems involving safety-related operations. In new business areas, the Company will strive to establish innovative business models in the anytime, anywhere, so-called ubiquitous technologies and the biotechnology-related fields.
- The Company emphasizes and continually enhances element technology (basic research) in support of all these technology projects.

## **Existing Business Areas**

### **1. Motorcycle Operations**

Total worldwide motorcycle demand in 2010 is forecast to grow 40% from 2001, to approximately 35 million units. The Company aims to achieve sales of seven million units by 2010, attaining a 20% share of the world market.

#### **(1) Increased Utilization of Aluminum Material Technology**

- Defining aluminum as the most important material that meets both environmental and functional requirements, the Company will raise the percentage of aluminum used to 40% of the entire motorcycle.
- Planning to introduce all-aluminum DiASil cylinders, best suited for small motorcycles which need to provide sophisticated function at low cost.
- Precision cast pistons are currently in use mainly for large motorcycles. The Company will expand their use for small models.
- Gradually expanding the use of CF aluminum die-cast frames, centering on large motorcycle models.

#### **(2) Enhancing Fuel Injection (FI) Technology to Satisfy Environmental and Product Performance Requirements**

- Gradually expanding the lineup of small motorcycles that incorporate the FI system, which was developed in 2002 as an optimum technology for these small models.
- Aiming to mount FI systems on all motorcycles, including large models, by 2007.

#### **(3) Expediting the Development of *Smart Power*, the Next-Generation Power Source, to Enhance the Company's Competitive Edge**

- Strengthening development efforts in the domains of rechargeable electric vehicles, hybrid vehicles, and fuel-cell vehicles.
- Enhancing the power performance and cruising distance of Passol electric commuter vehicles, aggressively marketing the Passol overseas and offering new model versions.

- Researching parallel hybrid and series hybrid vehicles by combining gasoline engine and electrically powered technology.
- Developing the world's first methanol fuel cell for motorcycles, suited for small models.

## **2. Marine Engine (Outboard Motor) Operations**

Worldwide total demand for outboard motors is not projected to grow significantly. Against this backdrop, Yamaha Motor is determined to move ahead with aggressive technology development to solidify the Company's leading position in the industry and build greater customer trust.

- Total demand has remained in the range of 750,000-800,000 units for the past ten years.
- Yamaha Motor became the industry's number one company in 2002 with a market share of 38% and about ¥130 billion in consolidated sales.
- The Company is targeting about ¥200 billion in marine engine sales in 2010. To this end, it is planning to expand marine engine and related businesses, with an approach based on "safety and peace of mind."
- Entering the rigging (peripheral) parts and alternative fuel outboard motor businesses and enhancing propeller operations.
- Strengthening on-board LAN telematics technology development for greater boating safety and peace of mind.

## **3. IM (Industrial Robot) Operations**

The IM operation centers on surface mounters and robots that mount chips on printed circuit boards and assemble semiconductors. Major IM trends include higher speed and precision, lower cost, and modularization. Yamaha Motor began the modularization trend, the first in the industry to propose solutions based on modularization. The Company aims to register about ¥50 billion or more in sales for this business segment in 2007 - twice the current level - by taking advantage of its expertise to drive business growth.

- Introducing high-speed mounters to lead strategic entry into the high-speed chip market.

- Introducing the I-Cube to lead strategic entry into the high-precision chip market.
- Deploying in-house technology and key products - IC handler and linear motor-driven robots - to lead strategic entry into the semiconductor peripheral devices market, and to advance into new markets.

This three-pronged strategic approach to chip and device markets defines the growth strategy in IM operations.

### **New Businesses**

Yamaha Motor will launch into IT and other “ubiquitous technology” businesses of the future, which can lend key technological support to the Company’s existing businesses. The Company will also expand its presence in domains such as aquabusiness and biotechnology.

#### **1. Ubiquitous Technology**

- The Company intends to combine telematics and ubiquitous technology to create new realms of Yamaha Motor excitement in businesses and entertainment. It will also employ these technologies to increase safety, comfort, and enjoyment in an array of applications.
- Developing innovative motorcycles capable of offering new interactive entertainment

#### **2. Water Treatment**

- Based on one of Yamaha Motor’s key environmental principles, “keeping water clean,” the Company will focus on developing water treatment as an environmental preservation technology. The Company is pursuing water treatment technology development and business applications in a wide range of fields beyond in-plant wastewater treatment.
- Expecting this environmental preservation-related area to develop into a high-growth market, the Company will seek out and exploit new business opportunities.

#### **3. Biotechnology**

Yamaha Motor developed the Bio Reactor from the standpoint of environmental preservation. The new technology absorbs and fixates CO<sub>2</sub>

by utilizing the photosynthesis functions of microscopic algae

- In this process the Company also succeeded in mass cultivation of a rare marine feed, *Chaetoceros gracilis* (with a density six times greater than any developed in the past).
- The Company is now planning to build a large-scale laboratory, designed to develop a reactor capable of mass cultivation.
- Besides *Chaetoceros gracilis*, the Company is developing useful proteins and other beneficial substances for health and medical purposes as well as other applications.



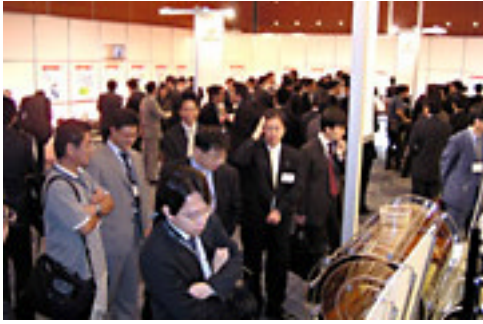
President Hasegawa gave an opening message  
at the Technology Briefing



At the Technology Briefing hall



President Hasegawa responded  
to interviews



At an exhibition hall



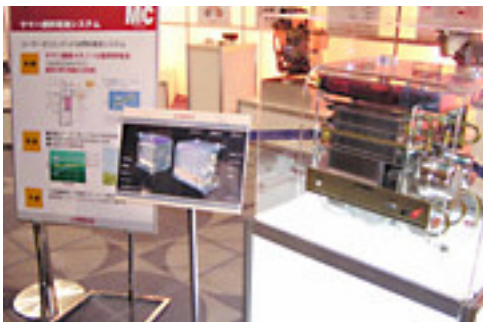
CF aluminum die-cast technology  
on display



Fuel Injection (FI) technology  
on display



The Yamaha "Passol",  
an electric commuter vehicle on display



Direct methanol type fuel cell unit



Marine engine technology on display

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