

Yamaha News

No.3

BIMONTHLY

A New Mission... Up-close Volcano Observation

The industrial-use unmanned helicopter Yamaha Aero Robot RMAX is the crystalization of state-of-the-art Yamaha technology born of long years of research and development accomplishments.

Boasting unequalled functionality and operability, the RMAX takes on a new mission.



Rotor stops within 20 seconds of engine cut

Liquid-cooled 2-stroke horizontal engine

Yamaha's exclusive YACS control system for outstanding flight stability

A radiator provides stable cooling performance even at high altitude or in the hottest summer weather

First unmanned helicopter with a 30 kg payload

Equipped with wheel attachment and carrying grip for easy transport



Flying Out Of Sight

A World First! Yamaha autonomous-flight unmanned helicopter plays vital observation role at erupting volcano

Actual observation photos of topographical and geological conditions in the area around Mt. Usu taken by the unmanned helicopter

At the end of March, the 732-meter active volcano Mt. Usu on Japan's northern island of Hokkaido erupted for the first time in over 22 years. The surrounding area was quickly declared a no-entry zone and several thousand local inhabitants were evacuated to temporary housing that they still occupy two months later. With the possibility of further volcanic activity still strong, the government-established field headquarters is continuing observation and information gathering on a full-time basis. Immediately after the initial eruption, the Public Works Research Institute of the Ministry of Construction asked Yamaha Motor Co., Ltd. (YMC) to cooperate in observation operations in the volcano's vicinity using a Yamaha industrial-use unmanned helicopter. YMC was quick to respond, setting to work to equip one of its helicopters with a GPS-based autonomous-flight system. Soon the specially equipped helicopter and a Yamaha operations team were headed to Hokkaido to join in the observation operations.

The unmanned helicopter on its way to gather pictures of the erupting Mt. Usu shooting up columns of smoke in the distance



A Yamaha-exclusive autonomous-flight unmanned helicopter

Named the "RMAX Mt. Usu Observation Special Spec," the helicopter being used to observe volcanic activity in the Mt. Usu area is a modified version of the production model Yamaha Aero Robot "RMAX," a industrial-use unmanned helicopter that has sold over 200 units in Japan for use primarily in crop dusting. It was an experimental model of the RMAX that was being developed for autonomous flight that was immediately outfitted with a full range of special equipment to answer the call to service at Mt. Usu. This same experimental model had already been used to gather precious data in areas like the grasslands of Mongolia and the ice flows of the Okhotsk Sea, but only while flying within the visual range of the operator.

For the Mt. Usu observation assignment, the heli-



The navigational GPS system is housed in the box on the right side of the helicopter. Next to it is an auxiliary fuel tank

copter was outfitted to operate under fully automated flight according to a computer map dictating the entire flight program, including lift-off and landing and round-trip navigation to the observation site, without any dependence on the radio controller normally used to operate the helicopter within the operator's range of vision. Autonomous flight systems of this type are presently under development at universities and research organizations around the world, but this represents the first time that such a system has been put to practical use in observation operations outside the visibility range of the operators.



Engineers put their all into intensive two weeks of development

"We got the request to cooperate in this project immediately after the first eruption, and what the government officials and experts at the volcano site all told us was that they needed to start observations as soon as possible. We responded with a development schedule that took just two weeks from the initial planning sessions to the first test flights," recalls Engineer Akihiko Suzuki of Yamaha's Aeronautic Operations.

"Since we knew that the observation site was far from the operations base and that we would be flying under very harsh conditions, a number of new technologies had to be applied."

The challenges proved to be difficult. According to the original request, the helicopter would have to cover a distance of about 10 kilometers just to reach the observation site over the volcano. With

300 meters being the accepted limit for radio-controller flight, the team knew their only choice was to create a functional GPS-based autonomous flight system. This was not to mention the other dangers the helicopter would face, like flying rocks and volcanic ash thrown up by the volcano, unstable air flows and the trees of the mountain that would have to be avoided. And, what methods should be used to for taking the actual observation photo images and relaying them back to the base? The list went on and on.

"Of course, it would have been easy to say 'No way. It just can't be done.' But to an engineer, the challenge was also an irresistible one. That was the spirit shared by all the eight people who eventually made up the development team. They are people who love the sky and get greater satisfaction from putting a craft in flight than anything else. We were all excited about the new horizons of potential we would be opening up for the helicopter if we succeeded in this autonomous flight project," says Mr. Suzuki. And thus began two sleepless weeks of trial-and-error development work.

In the end, a system by which the sensitivity of the helicopter's navigational receiver was increased to enable control by wireless radio signals at long distance was adopted. Furthermore, a program enabling full autonomous flight functions like speed control and hovering capability was added along with an in-flight course monitoring function and visual recognition equipment for verifying the helicopter's position with regard to the mapped flight route. And, to increase flying time, an auxil-

ary fuel tank was added, extending flight time from 60 minutes to 90 minutes.

As the observation equipment, a digital video camera, a single-lens reflex camera and a digital still camera were mounted along with three miniature cameras for navigational purposes. A separate communications system was also deployed to enable the images from these cameras to be sent real-time to the base control room. Provisions were also made so that the various images being sent by the helicopter could be viewed on a four-window split screen monitor to ensure effective data gathering and communication of appropriate navigational commands to the helicopter's control system.

While this development was going on, test runs of the observation system were being conducted virtually on a daily basis at a site near YMC's Iwata headquarters to prepare the team that would be sent to Hokkaido. Repeated tests of the communications systems and the other functions were conducted along with other measures like adding an extra radiator to augment the engine-cooling capacity.

In final tests conducted on the coastline near Iwata, the helicopter finally succeeded in completing a 10-kilometer autonomous flight navigating through a series of checkpoints along the way. Still, what the team knew was possible in theory often proved hard to achieve in actual flight conditions. In the minds of the development team was the repeating this success on the slopes of the smoke-belching volcano that the whole nation was watching daily on the evening news.

Arriving at ground zero, and the first successful flight!

After the first successful test flight there was a little time for celebration. On April 24, Mr. Suzuki and his operations staff of eight arrived in Hokkaido. The volcanic activity on Mt. Usu had quieted some compared to the initial eruption, but the danger was far from over. What's more, due to constant observational flights by manned helicopters on the perimeter of the no-fly zone that the Yamaha un-manned helicopter would be entering, the Yamaha team's observation flights would be limited to the morning hours before 8:30 a.m. to avoid the possibility of accidents in the congested air space around the mountain.

"The field headquarters had been set up in tents at a position just 1.5 km from the mouth of the volcano. Tensions were high at the camp, with thunderous explosions being heard up on the volcano from time to time as towering clouds of steam rose into the sky. The tension was palpable at the five police checkpoints the Yamaha team had to pass through on the road from their hotel to the base camp.

The helicopter we had brought was designed in a way that even if the communications system should go out temporarily, the GPS navigation system would maintain sufficient auxiliary information to keep the helicopter stable and flying on course. And, as extra insurance, it was also set up to enable manual operation from the base. Fortunately, however, the air conditions were relatively calm during our actual observation flights and there was little disturbance of the airwaves. So, everything worked according to plan," said Mr. Suzuki.

During the team's three days at the base camp the Yamaha helicopter made six observation flights, filming the targeted areas and successfully relaying the images back to the headquarters. The result was many clear, live images of changes in the mountain's topography and build-up of volcanic ash that could not be seen by the manned helicopters or the Defense Forces' aerial photographs. Some of the impressive images quickly found their way into the media where they were shown on nationwide TV and in the newspapers. In addition to sending out these images, the Yamaha un-manned helicopter proved valuable in a number of unexpected ways, such as for dropping scales to actually measure the depth of volcanic ash and gravel build-up, an important indicator for predicting dangerous mudslides.

The future of unmanned helicopter use

The Yamaha Aeronautic Operations main office reports that since its success on the slopes of Mt. Usu, numerous inquiries and offers have poured in from domestic and foreign agencies, research institutions and corporations.

"The helicopter is a fascinating device. It can hover in a fixed point in the air or move about freely in 3-dimensional space. An unmanned

helicopter also adds the advantage of safety, making it possible to go in and perform operations in areas too dangerous for



Mr. Akihiko Suzuki talks about his team's mission

Mr. Suzuki and his operation staff after completing the mission



humans. The recent Mt. Usu mission was excellent proof of that potential. In the future, I believe it will be possible to make use of this potential in a wide range of areas, from removing dangerous explosives and observation in forest fire or flood situations to safety inspections at nuclear power installations and the like," says Mr. Suzuki.

He goes on to add, "In order to realize this potential we first have to increase the reliability of the technologies. To become a successful product we have to achieve a reliability rate equal to that of a manned helicopter. And, eventually the development staff and I want to build a system that is so foolproof that it can be flown even by people who know nothing about helicopters, simply by performing the necessary commands on a PC."

It is nearly 20 years since Yamaha engineers first began developing commercial-use unmanned helicopters, and it may not be long before we see autonomous-flight unmanned helicopters like the Mt. Usu RMAX special performing all kinds of tasks in the world around us.

Yamaha industrial-use unmanned helicopters at work

Having made its name worldwide for the development and manufacture of products like motorcycles and outboard motors based on outstanding small-engine technology, Yamaha Motor began developing industrial-use unmanned helicopters in the 1980s. The year 1990 saw the marketing of the Yamaha Aero Robot "R-50," the first industrial-use unmanned helicopter with a 20 kg effective load capacity.

In recent years the Japanese farming industry has been plagued with problems like the aging of the work force and a lack of younger generation successors. In light of this situation, the Yamaha industrial-use unmanned helicopters have become the focus of attention as economical, environment-friendly next-generation agriculture devices that are now being used primarily for crop dusting. For example, in the case of dusting rice paddies, an unmanned helicopter can do the job in about 1/15th the time it takes with the conventional method where a person actually enters the paddy with a spray pump. Since 1995 these helicopters have mounted the Yamaha Attitude Control System (YACS), a Yamaha-exclusive technology that greatly increases flight stability and ease of operation through the use of flight pattern control models based on extensive flight analysis.

With YACS, all the flight control elements including, rudder, elevation and speed are subject to computer control that provides constant adjustments accord-

ing to the parameters of three different flight modes that the operator can select from according to the type of use. Thanks to this system, helicopter operation, which was previously considered a difficult skill, can now be mastered by new operators with just a short period of training. This in turn has succeeded in expanding the demand for these helicopters.



The Yamaha Aero Robot "RMAX" made its debut in October 1987, mounting a specially developed horizontally opposed liquid-cooled 2-stroke 241cc engine rated at 21 hp. This made possible an effective

load capacity of 30 kg at an operating weight of 58 kg. A total of 1,100 units of these two models have been sold so far in Japan.

The area of Japanese agricultural land presently being dusted by these helicopters has increased annually and is expected to reach a total of 200,000 hectares in the year 2000, including not only flat fields but also orchards, etc., on steep hill slopes.

Through YMC's subsidiary, Yamaha Sky Tech Co., Ltd., we are engaged not only in the sales of industrial-use unmanned helicopters but also the training of operators and repair service.



Renaissance with a Fifth Stroke

■ Yamaha Motor Do Brazil Ltda ■ Guarulhos (Sao Paulo), Brazil
 ■ Founded : 1970 ■ Employee : 415

Yamaha Motor Do Brasil Ltda. (YMDB) traces its roots back three decades to 1970, the same year Yamaha introduced its first 4-stroke motorcycle, the XS1. Then, just four years later in 1974, YMDB became the first overseas manufacturer of Yamaha motorcycles. Now, as a commemorative model for the millennium and the company's 30th anniversary, YMDB has launched its own Brazilian-built Yamaha 4-stroke, the YBR125E, targeted to boost its share in this promising market.

Motorcycle demand reflects economic recovery

Since 1994, when the new monetary plan "REAL PLAN" started, the Brazilian economy has been stabilized and the hyperinflation of the past seems to have disappeared. In the economic and social evolution connected with this, the motorcycle market expanded five-fold over the five ensuing years to reach 470,000 units in 1998.

This tremendous growth happened because of very strong demand for small motorcycles that are essential in people's lives here, and also the "consorcium" scheme which helps a lot in enabling people to make a purchase. More than 70% of all Brazilian motorcycle sales now are realized through this scheme, and more than 500,000 people are still waiting to receive their products. Therefore, in spite of the devaluation of the Brazilian currency (the Real), at the beginning of 1999, the motorcycle industry succeeded in minimizing the drop in demand to only 8%, in comparison with the year before. And this year, thanks to the rapid recovery of the Brazilian



YMDB Headquarters

economy, the motorcycle market has started to grow again, with total market demand on pace to pass 500,000 units for the year.

Yamaha and the Brazilian market

Yamaha Motor Do Brasil offers the domestic market a motorcycle line-up consisting of eight CKD models and six CBU models.

For export, Yamaha Motor Da Amazonia Ltda. (YMDA), our manufacturing subsidiary established in 1985 in Manaus, Amazonia and presently employing 400 people, is producing the DT200R, XT225 and TTR225M for markets including the USA, Canada, Argentina, Colombia and other countries, where they have been well accepted.

In the marine field we are also very active. YMDA started manufacturing Yamaha brand outboard motors in 1992, and now is producing three models at 15, 25 and 40HP. These three models make up over 70% of our total sales and are mainly used for fishing on inland waters such as the Pantanal, the largest marshland in the world. Yamaha out-

The launch ceremony for the YBR125E. YMC President Hasegawa (2nd from right) cuts the tape (left)





An international fishing contest held in Pantanal, where many Yamaha outboards are used



One of the new Yamaha dealers in Brazil. All the new dealers help in Yamaha brand building by following the Visual Identity standards

board motors have won an excellent reputation in the market, and fishing enthusiasts are choosing Yamaha outboards for their personal use in the great outdoors because of their high reliability and durability. Consequently, Yamaha has continued to occupy the No.1 position in the Brazilian market.

A Yamaha Renaissance

Motorcycle demand in Brazil is concentrated in the 125cc category. A big reason is that another brand dominated 60% of the market with a single model that created a preference for 125cc 4-stroke motorcycles in the minds of the buyers. Consequently, Yamaha had suffered a lot with its market share dropping below 10%, mainly due to our image in Brazil as a 2-stroke manufacturer.

In order to change its situation, YMDB's president, Mr. Yoshimi Watanabe, introduced an action plan in 1997 called "Renaissance Yamaha in Brazil." The plan aimed at "Recovery of confidence in the market," "Establishment of a solid business base" and "Customer and Community Satisfaction." Based on this Renaissance spirit, everyone involved with Yamaha here in Brazil, inter-

nally and externally, started working hard to change attitudes and the old ways of doing business we were accustomed to.

Regarding the dealer network, our sales section started a program of more aggressive and strategic new-dealer selection, visiting more than 600 cities with populations of over 100,000 in order to expand and strengthen our dealer network. By April of 2000, we succeeded in expanding our nationwide network to 207 dealerships, including 96 new ones. At the same time our product lineup had also been improved, with the launch of a marvelous 4-stroke line including the XT225, TDM225, XT600, XV250 and XV535, as well as the CRYPTON 105, Yamaha's first 4-stroke commuter for Brazil, which has been very well accepted even in the regions where Yamaha's presence was previously low.

Debut of the YBR125E!

In April 2000, the proud new YBR125E was born. This model was developed by YMC and YMDB as a joint project aimed at strengthening Yamaha's position in the domestic Brazilian market and throughout Latin America. It was launched as a commemorative model for the year 2000, the 500th anniversary of the discovery of Brazil and the 30th anniversary of Yamaha Motor Do Brasil. The catch phrase for the YBR's launch is

"The only model with 5 cycles. Four cycles on the bike. And an extra one cycle only for you." This market strategy was adopted firstly because Yamaha in Brazil wants to erase its strictly 2-stroke image from people's minds. The concept was also born of the idea of a resonance between the beat of the human heart and engine sound, as well as the Yamaha philosophy of providing "KANDO."

For the tape-cut ceremony at our Manaus factory, the president of YMC, Mr. Takehiko Hasegawa, was present to celebrate the line-off of the first YBR125E together with all the employees.

The reception of the new model by journalists and the market has been very good. Its high quality in styling, performance, comfort and economy is greatly appreciated.

To help promote the new model "YBR Caravan" events were held during March at more than 150 dealer shops, with more than 50,000 people turning out for the events.

Naturally, the dealer network is very enthusiastic about making another jump forward in sales in the coming season. With the YBR and the rest of our current lineup, YMDB is planning to achieve a sales level of 100,000 units per year and reach a 20% market share in Brazil in the near future. Moreover, we have already started to restructure our facilities and organizations in order to become a main factory in the Yamaha group.

For the 21st century we have started our biggest challenge ever.

Building the foundations to reach our targets will not be easy, but with our utmost efforts we are confident we can achieve them.

From Julio Yabuya, Yamaha Motor Do Brasil Ltda

Everyone was excited by the debut of the YBR125E at this Brazilian dealership



WORLD TOPICS

GENERAL

THAILAND

Fresh Start for Siam Yamaha

The Asian financial crisis that began in Thailand in 1997 dealt a hard blow to many industries. The Thai motorcycle industry was no exception, as demand fell from an annual demand peak of 1.46 million units in 1995 to just 530,000 units in 1998. The result for Yamaha's motorcycle joint venture Siam Yamaha Co., Ltd. (SYC) was a threatened future.

To prevent Siam Yamaha from defaulting on its loans and to meet the future demands of the already recovering Thai motorcycle market, an agreement has recently been reached between Yamaha Motor Co., Ltd. (YMC), the creditor banks involved and KPN Holding, YMC's joint venture partner which until now held 72% of SYC's equity and the management leadership role. Under the new agreement, SYC will be recapitalized with YMC investing 51% of the starting capital, the banks 34% and KPN Holding 15%. YMC will now assume the management leadership role and will also make two major parts supply companies 100% owned subsidiaries of SYC.

Eventually, motorcycle demand in Thailand is expected to rise above pre-crisis levels and YMC plans to use its global



SYC has reached a basic agreement with its supporting banks for the continuation of its business activities

corporate resources to help SYC become an efficient manufacturing base for completed motorcycles as well as parts for intra-regional supply.

INDIA

YMC Increases Equity Share in Indian Joint Venture



YMC President Hasegawa and Mr. Rajan Nanda of Escorts Ltd. signed the agreement

Yamaha Motor Co., Ltd. (YMC) and its Indian joint venture partner Escorts Limited recently announced an agreement by which YMC will increase its equity share in the company's motorcycle manufacturing and sales joint venture, Escorts Yamaha Motor Ltd. The deal will see YMC boost its equity share from the present 50% to 74% in a stock transfer, with the company's capitalization remaining unchanged.

In accordance with the change in share, YMC will assume management leadership of the company's manufacturing, marketing and technical and administrative operations as of June 1, 2000, and the company's name will be changed to Yamaha Motor Escorts Limited (YMEL).

Under the new management, YMC will be bringing its global expertise in the manufacturing, marketing and technological areas with the aim of increasing YMEL's competitive edge both in India and the export business and increasing the speed of new model development. Plans call for an expansion and improvement of the company's 4-stroke and present mainstay 2-stroke model lineups to meet the specific needs of the Indian market, presently the world's second largest. At the same time production and sales goals will be raised by about 20% for the first year (2000), with planned production rising to 300,000, and then to 440,000 in three years time as the market grows.

INDONESIA

New Parts Center for YIMM

On April 10 this year, a new parts center for YIMM (Yamaha Indonesia Motor Manufacturing), the largest of its kind amongst ASEAN (Association of South-east Asian Nations) countries, was completed in a new industrial zone in east Jakarta. An opening ceremony was held to mark the event, attended by representatives from YMC's Parts Operations, YIMM, YMKI (Yamaha Motor Kencana Indonesia) and local associated companies.

The site of the new parts center covers an area of 5 hectares, with a warehouse of 16,800 m². Proximity to the highway is an advantage for parts supply and delivery. Further more, a new parts control system, "Pro-Pack Ver U3.0," has been implemented, giving the center the capacity to develop quickly and efficiently on an increasingly larger scale for both domestic and export business.

From Mitsuhiro Hayashi of YMC, Japan



YIMM's parts distribution center can service the world from Indonesia

NETHERLANDS

Increasing influence of the Internet

The number of people using the Internet as their main source of information continues to increase dramatically. In the past, information on cars and motorcycles was sourced from a variety of media, including specialist magazines, but last year, the Internet emerged as the major source of information in the United States. Yamaha has not been slow to respond to this evolution. There are already 30 websites dedicated to Yamaha Motor group companies around the world, and more than 14,000,000 people visited those sites last year.

This phenomena has led to the 3rd World Webmaster Meeting on March



The significance of e-commerce was not lost on participants at the Internet conference in Amsterdam in March

22, 2000, over two days in Amsterdam, the Netherlands in conjunction with the European Webmaster Meeting. Fifty-six participants from 22 group companies from 19 countries attended. Information was exchanged regarding Web page application and management, with topics including effective use and safe measures, and improving strategies to cope with the new era. There was also considerable interest in e-commerce for consumers. There was time for questions after the presentations, and overall, the importance of incorporating e-commerce was brought home to the participants.

MALAYSIA

TPM Effort Kick-Off

On April 19, 2000, President Kwek Leng San and representatives of Hong Leong Industry, Malaysian Yamaha partner Hong Leong Yamaha Motor (HLYM) welcomed distinguished guests from the industry, including YMC Senior Managing Director Nagayasu to a ceremony to kick off the start of a program to win the TPM Prize for excellence in total production management. After an introduction to the TPM program for HLYR, the research center, HLYD, the sales subsidiary and HLYM, the chief operating officer, Mr Ng, gave an address expounding on the company's strong commitment to win the TPM Prize by 2003. Next, Mr. Nagayasu spoke, expressing his hope that all the manufacturing, sales and technological branches of the company will work together through the TPM challenge to boost corporate competitiveness. Following the ceremony, the company's commit-



Senior Managing Director Mr. Nagayasu encourages integrated TPM activities by manufacturing, sales and technical staff

ment was evident in informative inspection tours of HLYM and, the next day, Hicom-Yamaha Manufacturing Malaysia (HYMM).

From Masahiro Inoue of HLYM, Malaysia

MOTORCYCLES

CHINA

JYM 2000 Dealer Meeting

On March 27, Jianshe-Yamaha Motor Co., Ltd. (JYM) hosted a dealer meeting attended by representatives from about 200 dealerships around China at the famous tourist spot of Jinghong near the Laos border.

As a guest speaker, Director Shibuya of YMC stressed the fact that China has the world's largest motorcycle market demand and that future expansion of the industry and heightened product quality will contribute greatly to the society. He added that YMC will continue to work toward the sound development of the industry. Next, JYM's president Mr. Horai gave an address stressing the company's determination to

build a sales network that can answer the full range of user needs in the Chinese market.

After the presentation of awards to last season's outstanding dealers, JYM's General Manager, Mr. Xu Yi Ding gave a presentation on the 3S policy, stressing salesman training, serviceman training and speedy delivery of spare parts. Finally, the powered-up 2000 product line models JYM250 and JYM90 were unveiled. The new models and the staging of the presentation brought a standing ovation from the dealers along with numerous compliments.

From Takashi Uyama of YMC, Japan



Representatives from 200 dealerships around China attended the meeting



2-seater YZR500 gives taste of GP

Lucky celebrities and journalists, in Jerez, Spain for the Marlboro Spanish Grand Prix on April 29, 2000, got a breathtaking insight into the exciting world of 500 GP racing on the back of the Marlboro Yamaha Team's new twin-seater YZR500.

The two-up YZR, a 190hp factory V4, is like those raced by Marlboro Yamaha Team riders Max Biaggi and Carlos Checa in the 1999 500 World Championship, but with an extra seat. As well as being a promotional tool for the Marlboro Yamaha Team, the machine is designed to increase appreciation of GP racing outside the sport.

The bike is ridden by former Yamaha factory rider Randy Mamola, 13 times a GP500 winner, who also rode the first version of the twin-seater in 1996. We had a lot of fun, though I did hear a few screams from behind!" said Mamola "To give people such a buzz is amazing." Mamola will also ride the bike at the Italian, Catalunyan,

Portuguese and Valencia Grand Prix, as well as at the big Marlboro Masters motorsports event at Zandvoort on August 5 and 6.

"It's a real challenge riding the bike because you've got to think about the person on the back, and the bike behaves differently according to their weight and so on," added Mamola. "I'd say I ride the bike about 70 to 75 per cent of the maximum, but even at that pace everyone is just blown away by the braking and acceleration forces. There's no better way to show people how wild 500 GP racing really is!"

From Rupert Williamson, Marlboro Yamaha Team Marketing



Former Yamaha factory rider Randy Mamola pushed the 2-seater YZR 500 to the limits!

WORLD TOPICS

COLOMBIA

Yamaha Motocross Champions in '99

After a few years of hard work, sacrifice and solid preparation, 1999 was a year of victory for the Incolmotos-Yamaha Racing Team. They won every category they entered in the Colombian National Motocross Championships held in the main cities around the country.

In the 80cc class, first place went to Sebastian Velez. Winner in the 125cc class was Camilo Zapata, and in the 250cc class, Juan David Posada took first place. All three riders were riding for Team Incolmotos-Yamaha.

These wins are helping the Yamaha YZ racing motorcycles gain even greater acceptance in Colombia.

From Guillermo Escobar of Incolmotos, Colombia



Incolmotos-Yamaha Racing Team showed off the Yamaha YZ racing bikes to the people of Colombia by winning every category in 1999

SPAIN

Yamaha Road Assistance in Spain

In 1999, Yamaha Motor Spain (YMES) implemented a service initiative to further enhance their "kando" policy for customers and to provide added value to their year 2000 motorcycle range. YMES reached a collaboration agreement with Universal Assistance (RACC) whereby all customers buying any new Yamaha motorcycle or scooter

with engine capacity over 51cc will have, along with the factory warranty, a complete Road Assistance Service, free of charge, for one full year. In addition, this service will be one phone call away anywhere and anytime within Spain.

Every new Yamaha client will receive a Yamaha Assistance Card with a 24-hour telephone number that will get them immediate assistance and after-sales service. Naturally, Yamaha clients will receive their road or city assistance from professional mechanics riding ABS-equipped Yamaha motorcycles (GTS1000A) or scooters (YP250ABS) specially modified for everyday repair duties.

From Albert Cumellas of YMES, Spain



Yamaha Road Assistance Fleet bikes in Spain will provide 24-hour professional service to new customers who might need help on the road

THAILAND

21st Bangkok Motor Show



Visitors enjoyed the demonstration and the displays at the Yamaha booth

From March 31 to April 9, the Thai capital was host to the 21st Bangkok Motor Show. Some 1.5 million visitors from across Thailand and its neighboring countries flocked to the show during its 10-day run.

The display of motorcycles and other products at the Yamaha booth was enlivened by attractions including performances by professional dancers. Visitors also lined up to try out the demonstration



models fitted with sound simulators that had been so popular at last autumn's Tokyo Motor Show. Besides the Thai-market models, special exhibition models like race machines, as well as the R7 from Japan and the custom bikes from YMUS added color to the display.

The Show also became the venue for the introduction of the new slogan "Touching Your Heart" that will be used in the five ASEAN countries of Indonesia, Malaysia, Philippines, Singapore and Thailand in activities aimed at promoting CS.

From Katsumi Tamura of YMC, Japan

TAIWAN

Yamaha Motor Taiwan Dealer Meeting

The year 2000 Yamaha Motor Taiwan (YMT) Dealer Meeting took place on April 20 in Taichung. Held in grand style under the theme of "Crowning of the Year 2000" and with guests including YMC's President Hasegawa, the meeting drew representatives from some 2,500 dealerships across Taiwan. In addition to an awards ceremony for outstanding dealers of last year, the new models and business policies for the coming season were introduced. A show by the internationally-known actress Karen Mok was a highlight. Karen is the personality attached to the Yamaha Vino scooter. The gala agenda delighted the dealers, who were quick to express their big expectations for Yamaha.

Those expectations were also reflected in the success of the press launch of the new Vino Bianco 125 the day before at a Taipei hotel that attracted an overwhelming press turnout and generous coverage on TV and in the newspapers.

From Hidetoshi Amabuki of YMT, Taiwan



YMC President Hasegawa, who attended the meeting, and new Vino Bianco 125

CANADA

F100 for the Northwest Passage

Yamaha Motor Canada (YMCA) recently received a plaque of appreciation from the Royal Canadian Mounted Police (R.C.M.P.) for donating a Yamaha F100 4-stroke outboard motor for use on the inflatable lifeboat of the *St. Roch II*.

On July 1, 2000, the *St. Roch II* is scheduled to leave the port of Vancouver on Canada's west coast and duplicate the historic feat of its famed predecessor, the *St. Roch*, by sailing north and east through the Arctic waters around the North American continent by the route known as the Northwest Passage, first navigated by the *St. Roch* in 1940. After making this difficult passage the *St. Roch II* will continue on a 6-month circumnavigation of North America before returning to Vancouver.

Yamaha outboards have proven their durability, reliability and toughness in use under freezing sub-zero temperatures and brutal conditions and it is expected that the F100 will give the same kind of service on the *St. Roch II*.

From Kyle Iida of YMCA, Canada



St. Roch II is ready for departure (below) and Mr. Nakamura, president of YMCA accepting the plaque from Mr. Delgado, executive director of Vancouver Maritime Museum



Photo © Vancouver Maritime Museum and RCMP

FRANCE

ATVs Help Clear Oil Spill



In Operation "ATVs on the Coastline", 10 Yamaha Grizzly 600cc 4x4 were used most convincingly for the first time in an oil cleanup operation when the Atlantic coastline was threatened by 15,000 tons of oil from a wrecked oil tanker.

Yamaha ATVs proved an efficient answer to alleviating a marine disaster in the Atlantic Ocean last December. Following the wreck of the Maltese oil tanker *Erika*, 15,000 tons of oil reached the Atlantic coastline. Ten Grizzly 600cc 4x4 Yamahas fitted with specially designed trailers were employed to clean up the big spills.

The company in charge of cleaning the affected coast, Total Fina, and ADS (Actors of Solidarity) association, conceived of a program of global intervention on the oil spill sites. Conclusive demonstrations of the machines led to the purchase of 10 Yamaha ATVs in January, and they were set for use immediately in collecting bins of pollutant and surveying polluted sites. ADS trained and supervised the drivers.

By the end of the operation, the ATVs, never before used in an oil spill operation, had transported 5,369 tons of pollutant, with a record of 38 tons in one day by a single ATV. They covered 34 sites along 200km. They were also used to transport worker teams, collect oil-catching nets each morning, and carry stranded marine animals.

The innovative, high performance ATVs proved indispensable for this kind of operation, and it was discovered that the ATVs had better collection capacity and speed in a cleanup operation, even when replacing more expensive, heavy machinery such as tracto-

We are always looking for interesting stories. Write to Chief Editor T. Sato of the PR Division. Yamaha Motor Co., Ltd. 2500 Shingai, Iwata, Shizuoka 438-8501 Japan. satoutetsuo@yamaha-motor.co.jp

shovels. A challenge was to clean up particularly difficult sites such as cliffs, which are inaccessible to big cranes. They did so using three ATVs with winches.

Further, the ATVs proved to be ideal for use in protected sites for a variety of reasons. They do not leave tracks, do not compress pollutants into the earth, and can cross rocky areas without damaging them, all due to the low load of the machine of 200g/cm². As a reference, an 80kg person has a load of 450g/cm².

To maintain the machines, which were in constant contact with salt water and corrosive pollutant, they were cleaned daily, electric eyelets were checked daily, and the oil was changed weekly during a general inspection.

From Chrystelle Gry of Yamaha Motor France, France

Corrections and Apologies

In the article "Snowmobile Dealers Meeting Held" (Canada) in the World Topics section on page 9 of our last issue, Yamaha News No. 2 (April 1) the following titles and name were given incorrectly.

The title of Mr. Nagayasu should read "YMC Senior Managing Director," the title of Mr. Yoshida should read "YMC Senior General Manager of RV Operations," and the name of the Vice President of the North American Snowmobile Headquarters should read Mr. Yasui instead of Mr. Yasuda.

We apologize for these mistakes and any inconvenience they have caused the people involved.

Yamaha and Yanmar Diesel Expand Cooperation

On March 28, 2000, an agreement was signed between Yamaha Motor Co., Ltd. (YMC) and Yanmar Diesel Co., Ltd. for the OEM supply of pleasure-use boats and fishing boats and the supply of other products.

Specifically speaking, the agreement calls for the mutual OEM supply of small engine-mounted pleasure-use boats (20ft. 6-meter class) and small fishing boats (17~40ft. 5~12-meter class) presently in both companies' lineups.

Also, in the area of larger pleasure-use boats, Yamaha boats mounted with Yanmar diesel engines will be supplied on an OEM basis to Yanmar. Other products to be supplied under the agreement will include an expanded range of fishing boat models that YMC has been supplying to Yanmar in the past. While the continued recession in the Japanese economy has hurt overall demand in the marine market, there are still strong sectors like saltwater sport fishing and freshwater bass fishing as well as popular new watersports like wakeboarding. The aim of the agreement is to provide greater stability and efficiency in the FRP boat manufacturing activities of both companies and allowing them to make more effective use of their respective development and manufacturing resources and core strengths in ways that will allow them to offer the customers stable supply of high-quality products. With regard to sales activities, the two companies will continue to conduct their own individual and independent activities.



Mr. Kajikawa, Director of YMC (right) and Mr. Higashimori of Yanmar Diesel Co., Ltd

Environment Exhibition opens at Communication Plaza

On May 8, an opening ceremony was held for a new exhibition titled "Environment Exhibition: Aiming Toward a Unity of Ecology and Kando" filling the 2nd floor exhibition space of the Communication Plaza at YMC's headquarters in Iwata. Hosting the ceremony were YMC Managing Director Yamashita and other staff of the company's Environmental Affairs Div.

This special exhibition is designed primarily to highlight the accomplishments of the environmental conservation activities being conducted throughout Yamaha's divisions so that all Yamaha employees can share in the knowledge and understanding of what has been achieved and be inspired to work even harder to achieve the goals set under the company's 2010 Environment Action Plan. Laid out in a garden-like atmosphere, the show is made up of exhibits illustrating environmental projects undertaken from throughout the company and at the subsidiary factories and business offices, like an exhibit of the minnows raised at the new "Biotope" nature space at the Hamakita Factory Site. There are also video shows for children.



The exhibition is designed to highlight the accomplishments of the environmental conservation activities at YMC

Yamaha IM Operations Incorporated as New Company

Yamaha Motor Co. Ltd. (YMC) is presently in the process of adopting a new company system that will give greater management autonomy to divisions within the company and empower them to conduct comprehensive manufacturing, marketing and technological activities with greater dynamism and flexibility to meet the changing demands of the marketplace.

This company system will be adopted for divisions that have a strong business base with the potential to continue to function profitably in the changing business environment and to assume responsibility in the areas of employment and labor conditions. Under the system the divisions will become companies led by a representative officer with the title of company president.

As a division that already meets these qualifications, YMC's Intelligent Machinery (IM) Operations, which engages primarily in the development and manufacture of surface mounters and other industrial robots, officially became YMC's "IM Company" as of April 1, 2000.

Just two days later, on April 3, the IM Company president, Mr. Togami, presided over the launch ceremony of a new company for the manufacture and sales of surface mounters (for mounting electrical parts on printed circuit boards). The



IM Company's office building in Hamamatsu-City

new company, named i-Pulse Co., Ltd., combines Yamaha surface mounter business with part of the business of Japan's third largest manufacturer of mid-size surface mounters, Tenryu Technics.

A Security Role for the Okinawa Summit

When the eyes of the world focus on Japan's southernmost islands this coming July as international leaders gather for the Okinawa Summit, Yamaha Personal Water Craft will be an important part of the Police Coast Guard fleet making sure the waters around the conference venues are secure.

On March 24, a total of 20 "MJ-700VN-R" Yamaha Personal Water Craft were delivered to the Okinawa Prefectural Police (14) and the Fukuoka Prefectural Police (6), and from April 1 they have been on active patrol duty, covering the relatively shallow coral-reef water areas around the Summit's main lodging and conference venues.

Personal Water Craft are outfitted for their role in this international conference with red revolving beacons and special two-color lights to accommodate night duty as well.



Newly delivered PWCs are ready for patrol duty

World's First Unmanned Atmospheric Survey Boat, *Kan-chan*

Capable of one month of continuous operation in survey conditions

Development background for *Kan-chan*

Without a doubt, one of the most urgent environmental issues confronting mankind today is the warming of the planet through the so-called greenhouse effect. Global warming is already being cited as the cause of abnormal weather conditions and shrinking of the polar icecaps, which will eventually lead to higher sea levels.

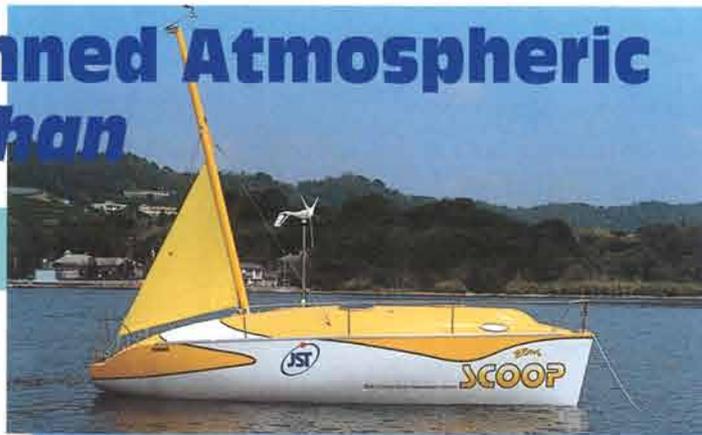
However, despite the attention this potentially disastrous phenomenon is receiving from scientists around the world, there is still a lack of quality data about changes in air quality and temperature, etc., over the oceans that make up over 70% of the earth's surface. In particular, there has been insufficient data about the aerosol content (colloidal particles), which is believed to play a vital role in global warming.

To answer the need for mobile data gathering over the Pacific, Yamaha Motor Co., Ltd. recently designed and built the world's first unmanned ocean-atmosphere observation boat at the request of the Japan Science and Technology Corporation (JST). The new high-tech boat, named *Kan-chan*, was launched at the end of March and is now engaged in its first test operations.

As Japan's largest marine manufacturer with four decades of proven expertise in small engine and boat design, as well as sophisticated electronic control technologies, Yamaha Motor was the natural choice to build an unmanned observation craft that could move at low speeds over wide areas of the North Pacific.

Until now, measurement of aerosol content in the air over the oceans was limited to fixed observation stations on remote islands or a limited number of boats and observation buoys. As a result, with regard to large areas of open ocean, particularly in the North Pacific where there are no islands, data has been lacking. As the world's first unmanned ocean-atmosphere observation boat, the *Kan-chan* will make it possible to gather data over long periods and wide areas of the ocean without committing valuable human work time to the task.

In designing and building *Kan-chan*, Yamaha Motor made full use of its wide-ranging marine technology gained over long years of experience in the fields of small powerboat and sailboat design and construction.



Features of the observation boat *Kan-chan*

Because the observation boat's use calls for slow movement between locations as well as the ability to remain stationary within a given area during measurement operations, the hull design of the 7.99m (26ft.) "Yamaha 26 II S" sailing cruiser with its low resistance and excellent course-holding qualities was chosen as the base. To it, several new design elements were added along with a re-designed deck. Furthermore, the combination of a deck designed with the image of an orca (killer whale) and the low center-of-gravity hull, gives the *Kan-chan* a righting capability similar to that of a sailing cruiser.

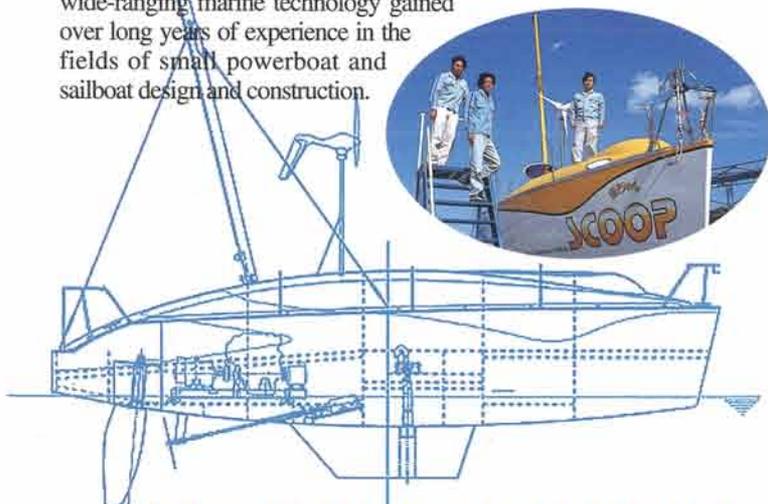
The observation instruments carried by *Kan-chan* are positioned atop a specially designed mast located at the stern, which can also raise a small sail to keep the bow of the boat pointed into the wind, and thus enabling the boat to take waves from the bow. Included in the instruments are the same type of sensors used for pedometer analysis on the Pathfinder Mars probe, which measures the presence of man-made aerosols and heavy-metal elements in the air. The boat is also equipped with instruments for automatically sampling the plankton content in the water.

For its power system, *Kan-chan* is outfitted with AC and DC generators powered by a diesel engine, plus a wind turbine generator. These feed a battery block consisting of six 12V-80AH batteries. The observation instruments are run on AC100V-1.2KW current, while the boat's propulsion system (propeller) and rudder are powered on DC24V current. DC12V current is also supplied for the boat's control mechanisms and other equipment. The wind turbine generator provides back-up 12V power. With a fuel capacity of 1,400 liters (368 US gallons), *Kan-chan* is capable of 700 hours of continuous running at a speed of 4 knots (on flat water). This is equivalent to the capacity necessary for about one month of actual operation in survey conditions.

The boat's control system consists of a microcomputer and the various data-gathering instruments such as the GPS positioning system, speedometer, compass, wind direction and speed gauges, etc. The boat is run and navigated automatically by means of a system in which satellite-fed directions from land regarding destination are processed in relation to the boat's present position as determined by the GPS. From this, signals are generated to provide appropriate motor rpm (boat speed) and rudder angle.

Yamaha Motor's command of broad-ranging technologies across its many divisions made it possible to design and build everything on *Kan-chan*, from the boat itself to all the systems it carries, including the propulsion system, boat control system and automatic navigation system.

Since its launch, *Kan-chan* has been undergoing automatic navigation tests and instrument tests on Lake Hamana-ko near YMC's headquarters and nearby coastal waters. By spring of next year it will be ready to begin full-fledged survey activities in the western North Pacific.



Kan-Chan features a wind turbine generator above its deck. There are also atmospheric observation instruments at the bow and water testing instruments at midship, while at the stern is located the battery system instruments

Yamaha riders hot in both GP and SB

Road Racing World Championship



Abe on the Winner's podium at the Japan GP (above), and running in the French GP at Le Mans (below)



Le Mans, France was the stage for the 5th round of the World Road Racing GP, and Antena 3 D'Antin team's Norick Abe came back from a no-point finish in round 4 after his spectacular win in round 3, the Japan GP. Here at Le Mans he led the race all the way to the last lap and just missed the win by an excruciating 0.3 seconds to finish 2nd and move himself into 5th place in the overall point standings.

In the same race, Red Bull Yamaha WCM's Garry McCoy, who won the season's opening round, came on strong in the latter stages to finish 4th and keep 3rd place in the point standings. Also, Marlboro Yamaha Team's Carlos Checa, who had scored three 2nd-place finishes up until round four, came home 7th to 2nd in the point standings.

In the 250cc class, Chesterfield Yamaha Tech 3 teammates Shinya Nakano and Olivier Jacque finished 2nd and 3rd respectively in this, their team's home GP. Nakano now stands 2nd in the point standings, just 4 points behind the leader, while Jacque is in 4th position.

Meanwhile, the World Superbike Championship series kicked off in South Africa on

April 2, where Yamaha rider Noriyuki Haga finished 2nd in a close first heat before winning the 2nd heat. Since then he has continued to rack up the points with strong finishes to hold his lead in the point standings. On May 14, at the 4th round of the series at the UK's Donnington Circuit, Haga finished 4th in both heats to keep himself on course toward the season title.



Nakano and Jacque finished 2nd and 3rd at the French GP

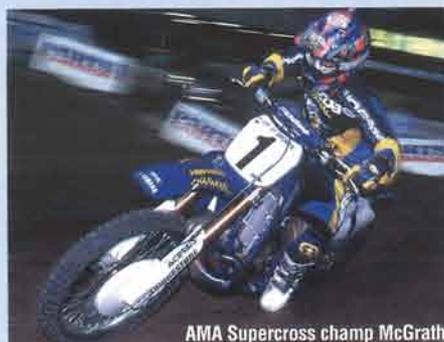
Haga (here at round 3 in Sugo, Japan) now ranks first in points in the WSB



Yamaha grabs one-two in 250cc class championship Third consecutive title for Jeremy McGrath

2000 AMA Supercross Series

On April 29, at the 15th round of the 2000 AMA Supercross Championships held in Juliet, Illinois, USA, Chaparral Yamaha's Jeremy McGrath (USA) and his YZ250M clinched the season title with one round still remaining in the series. Meanwhile, Yamaha USA's David Vuillemin (France) finished the season 2nd to give Yamaha a one-two sweep. The 16-round year 2000 Supercross series started in Anaheim, California on Jan. 8 and ran until the closing round in Las Vegas on May 6. In the final round, McGrath won once again, giving him a total of ten wins in the season. Add to this Vuillemin's four wins and Yamaha had an



AMA Supercross champ McGrath

impressive total of 14 wins on the AMA Supercross season, rewriting the 20-year-old record for most season wins by a manufacturer. McGrath's win in the final round

was his 70th career win at 250cc Supercross and his 100th win when combined with those from his 125cc days.

Also, in the 8-round 125cc Eastern Regional Supercross series which is held in conjunction with the Supercross series, YZ125 pilot Stefane Roncada clinched the season title in the final round at Juliet on April 29.



McGrath (left) and Vuillemin (right) at round 15