

2004 C&C Prize Recipients are Honored

The Foundation for C&C Promotion (President: Hajime Sasaki, Chairman of the Board, NEC Corporation) was established as a nonprofit organization funded by the NEC Corporation in March of 1985. It was established to promote pioneering research and development efforts related to C&C, the integration of computers and communications technologies, with the aim of advancing the sciences, advancing communication between people, and contributing to a culture in which each person can reach their maximum potential.

In order to advance these objectives, the foundation has three main activities: 1) awards (C&C Prizes), 2) grants (for researchers attending international conferences, for non-Japanese researchers, and for receivers of doctorates), and 3) surveys and research.

The year 2004 marks the 20th year of awards presentation by the Foundation for C&C Promotion. The 2004 C&C Prize was announced in a presentation ceremony at the Hotel Okura on January 26th, 2004. This year, 3 awards were given for researchers in two separate research areas.

The first was for Dr. Zen'iti Kiyasu, Former Professor of Tohoku University and Former Executive Vice President of Iwatsu Electric Co., Ltd. for "Pioneering contributions to the information communication industry by leading research and authoring textbooks on basic theories for electronic circuitry, computers, and communications, and for the development of various systems such as those for PCM communications, error correction coding, computers, and electronic switching." His development of the first paramatron computer named MUSASINO-I and magnetic storage systems built the foundation of the Japanese computer industry.

Dr. Kiyasu always pioneered and led with new ways. He foresaw close connection between computers and communications technologies that was to arise. Many human resources have been cultivated by him.

The second C&C Prize was for Prof. John L. Hennessy, President and Prof. of Electrical Engineering and Computer Science, Stanford Univ. and Prof. David A. Patterson, Prof. of Computer Science, Univ.

of California, Berkeley for "Contributions to the advancement of computer science, engineering, and industry through inspiring textbooks, research, and professional services for computer architecture." They have contributed to the advancement of computer architecture. After the invention of RISC architecture by John Cocke (the recipient of the 1994 C&C Prize) they further developed RISC architecture and built RISC based VLSI processors. MIPS and SPARC RISC chips are the result of their effort and are used by many servers and workstations and are also used as embedded processors for game machines, terminals, and communication equipment. Co-authored textbooks on computer architecture have been widely read worldwide.

Their contribution to R&D, transfer of technology to industry, and the cultivation of human resources are highly appreciated.

At the awards ceremony, President Sasaki presented a certificate, a plaque, and a cash award (10,000,000 yen) to recipients, respectively. After the awards ceremony, the three scientists presented acceptance speeches, followed by a reception.

Foundation for C&C Promotion



Photo 1 2004 Prize Recipients (from left, Dr. Kiyasu and his wife, President Sasaki, Prof. Hennessy and his wife, Prof. Patterson and his wife.)

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NEC Reorganizes Its 3rd Generation Mobile Terminal Platform Strategy for Global Business

NEC Corporation announced that it has reorganized its platform strategy for 3rd Generation (3G) mobile terminals.

As part of NEC's new 3G (dual mode of W-CDMA and GSM/GPRS) mobile terminal platform strategy for global business, NEC will employ additional platforms from Qualcomm Incorporated and Ericsson Mobile Platforms.

NEC has recently announced its strategic move to jointly develop system LSI for 3G with NEC Electronics Corporation (<http://www.nec.co.jp/press/en/0411/2201.html>). With these platforms and current platform in place, NEC will be ready to offer a wider range of 3G mobile terminals to meet the various demands of 3G mobile operators and end users in a timely manner, because the services and functions required to advance 3G services vary in the future as 3G market grows and expands globally.

The platform strategy will be modeled based on its success of 2.5G mobile terminal product development strategy driven by NEC's Chinese operation. In recent years, NEC rapidly organized its mobile terminal business structure in China by effectively combining its resources in Japan and China and those of its partners such as Techfaith Wireless, the largest design house group in China, STEP Technologies, a joint venture of Techfaith Wireless and NEC, and other design houses in China, Korea and Taiwan. The new business structure has empowered NEC with highly effective and speedy product development to introduce many products to the market in a short period. NEC recently launched its flagship models and other terminals which come in a variety of designs and functions, demonstrating NEC's cutting-edge mobile technologies in China. More than 20 varieties of terminals will be launched this year for China. NEC Telecom (China) is playing a key role in developing new products not only for China but for the global market by adjusting its platforms developed in China for other markets. Such know-how in 2.5G will add value to its 3G development globally.

By utilizing Qualcomm's platform, NEC has introduced prototype of new 3G handset which features a very small and compact design of 86.1cc in volume,

89g in weight and 117mm × 46mm × 16mm in dimensions. It is developed as a popular 3G model with high functionality such as 3G video function, by fully utilizing its resources and staff in China. NEC will launch this terminal at the beginning of 2005 and intends to propose it to carriers in China for their 3G trials.

At the same time, NEC has started developing new 3G handset by using technology supplied by Ericsson Mobile Platforms — a company that brings experience from developing technology for over 200 million units of mobile phones deployed in over 100 countries in the world. NEC will introduce its first commercial terminal of this platform within the 1st half of FY2005 (April 2005-September 2005). NEC will further propose the supply of new EMP-based 3G terminals to Hutchison 3G group and other 3G operators.

By combining these new platforms, mobile and radio technologies and cutting-edge production technologies, particularly in ultra-thin packaging technology which realizes card-shaped mobile terminal (<http://www.nec.co.jp/press/en/0402/0301.html>), NEC will introduce attractive and compact 3G terminals to the global market in an effective manner.

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(a) Front view.

(b) Rear view.

Photo 2 Prototype of NEC's 3G terminal realized by Qualcomm Platform.

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NEC to Launch New Mobile Phones to Malaysia - New Brand Strategy & Slogan “Get Personal” To Expand Mobile Business in Malaysia -

NEC Corporation and NEC Malaysia announced new Mobile Phones “e238” and “e101” to Malaysia. NEC also reveals its new branding strategy and slogan “Get Personal,” which is in line with NEC’s global corporate statement “Empowered by Innovation,” to further expand its mobile business in Malaysia.

Starting with these two new models with three color variation as one of the key products, NEC will pursue its new strategy to enter into the wider-range product market segment to appeal to various consumers in Malaysia. With the new and specific target market segmentation, NEC will further launch products answering to the requirements from every customer of each segment.

“Get Personal is a new slogan to help NEC increase its awareness in the mobile terminals arena and build brand loyalty in Malaysia. We are aiming to position the company as the most creative, leading mobile solutions company within 2 years. Variety of mobile terminals are being introduced for the global market this year. This new slogan will be a dynamic step towards strengthening NEC’s presence in the Malaysian mobile market, and is also in line with the strategic move to expand NEC’s mobile business globally.” said Mr. Hiromi Orikasa, General Manager of Mobile Terminals Marketing & Sales Division, NEC Corporation.

“Our latest challenge regarding current brand per-

ception is to create a unique, human and user-friendly image, showing NEC’s deeper level of communication with consumers by defining ourselves as a “people company,” which proactively reaches out to customers to gain knowledge about their needs in Malaysia. Then, customers can acquire not only the latest state-of-the-art technology but also a mobile phone that suits their own lifestyle.” said Mr. Takao Shimada, Managing Director of NEC Malaysia Sdn Bhd.

The new models introduced today are clamshell-shaped e238 & e101. They target a wider range of people, from business to individuals, with friendly, simple and stylish designs. The feature-packed e238 are equipped with 300,000 pixels digital camera with various camera functions, 1.9 inch color large TFT screen with 65,000 colors, JAVA and MMS. The e238 also feature 64 polyphonic ring tones and also support motion jpeg, movie CLI, MP3, IRDA and USB connectivity, among other things.

“Malaysia is one of NEC’s most important markets where NEC can demonstrate its full competence in mobile internet. NEC expects further strong initiatives by NEC Malaysia will help create the market and aid NEC in obtaining a leading position there.” said Mr. Orikasa.

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(a) e238.



(b) e101.

Photo 3 New mobile phones to Malaysia.

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NEC's MIR Solution to Expand Introduction of Mobile Multimedia Services with Flexible Charging Method - Telefónica Móviles in Spain will be the first user to adopt this solution -

NEC Corporation announced that it has received an order for its Messaging Intelligent Router MMS (MIR) solution from Telefónica Móviles España, S.A., Spain's largest mobile operator with 18.7 million subscribers. With a population of 41.11 million people and an 83% mobile phone penetration rate, Spain boasts one of the highest levels of mobile phone penetration in Europe.

The MIR Solution is a server software system that can easily be added on to existing MMS (Multimedia Messaging Service) and mail server systems of mobile operators. The MIR solution is an advanced, new method to extract necessary data from MMSs and transfer it to a charging system enabling flexible and attractive charging menus. NEC has realized the MIR Solution for Telefónica Móviles by integrating MIR and existing systems provided by other vendors demonstrating its system integration capabilities in mobile solutions.

The main function of MIR is to transfer required information contained in MMSs to charging systems to create CDR. In case of different MMS/mail systems are employed, MIR distributes mail traffics from mobile handsets into mail servers according to the load of the traffic. In case of problems with the system or restriction from individual customer, MIR can automatically decide distribution control. Also in case of troubles MIR can create data required for charging.

NEC's MIR functions enable various charging menus. Depending on the users' attributes or user-group, a package rate or discount can be offered such as a corporate discount menu. Additional services such as a birthday discount or a special discount by age can also be incorporated with users' personal information. In addition, the charging menu can be varied by mail content such as text mail, photo attached mail or video clip mail.

Multimedia content distribution, together with Multimedia Messaging Service (MMS) were launched in 2002, and are vital elements in the business strategies of European and Asian mobile operators looking for ways to increase their average revenue per user (ARPU, i.e., per user sales). Multimedia services will, while stimulating new user demand, also trigger new mobile terminal sales.

With the introduction of NEC's MIR Solution, end-users can enjoy attractive charging services, while mobile operators can provide highly detailed and value added charging menus to increase subscribers and expand their ARPU.

Since June 2003, NEC has, using i-mode technology and know-how provided by NTT DoCoMo, supplied Telefónica Móviles España with the mobile Internet platform system and i-mode terminals required for its MoviStar emocion mobile Internet service. NEC has also supplied mobile Internet service platforms using i-mode technology to FE Telecom in Taiwan, Bouygues Telecom in France, WIND in Italy, Cosmote in Greece and Telstra in Australia. Transfer of all these systems has proceeded smoothly. To NEC, the new order from Telefónica Móviles not only adds to a growing record of success overseas; it is also an opportunity to strengthen its business as a supplier of non-i-mode-platform technology in the mobile Internet sector. As the telecommunications world transitions from 2.5G to 3G, NEC looks forward to further fleshing out its mobile Internet application line-up and actively developing new mobile Internet platform businesses targeting mobile telecommunications providers aiming to increase profitability and improve customer satisfaction, by offering attractive mobile Internet services.

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NEC and NEC Electronics Join Forces to Develop System LSIs for 3G Mobile Terminals

NEC Corporation and NEC Electronics Corporation announced that they had entered into a close collaboration to jointly develop a system LSI for 3G mobile terminals, in line with NEC's strategy to

strengthen the competitiveness of its 3G mobile terminal platforms for the global market. NEC formed a strong partnership with NEC Electronics, the leader in single-mode (W-CDMA) 3G baseband LSIs in

Japan, and the two companies will jointly develop a dual-mode (W-CDMA and GSM/GPRS/EDGE) 3G baseband LSI which will be the core of 3G mobile terminals.

NEC and NEC Electronics formed a joint project team and commenced development recently to realize a globally competitive LSI. NEC's mobile terminals business unit will be responsible for defining basic LSI specifications and verifying the LSI to be embedded in the mobile terminals. NEC Electronics will be responsible for the LSI design, development and production. The first mobile terminal which employs the LSI will be introduced to the market between October 2006 and March 2007.

Through this collaboration, NEC Electronics, which currently holds the number one market share in Japan for single-mode 3G platforms, aims to extend its expertise to dual-mode 3G platforms for the global market. NEC has been involved in 3G research and development for a long time, accumulating leading 3G technologies and know-how, realizing world's first commercial W-CDMA mobile handset, and contributing to 3G standardization activities. By leveraging the two companies' extensive technological competence in 3G terminals, communication and electron devices, NEC can quickly realize highly advanced mobile terminals that use 3G technologies such as HSDPA.

In addition, NEC is also strengthening its development effort in Linux platform for mobile terminals,

enabling effective and horizontal utilization of software development resources inside and outside company, helping to decrease development time, and supporting new mobile applications and services. NEC's Linux platform for mobile terminals will employ the jointly developed baseband LSI. With the effective combination with NEC Electronics' MP211 application processor, advanced and high performance mobile terminals applications such as terrestrial digital TV combination, various multimedia applications and voice recognition can be realized. Both companies will also strive to realize smaller, more compact mobile terminals by decreasing the size of the LSI and by creating an architecture to enable combination of the baseband LSI and application processor into a single chip.

NEC Electronics will also sell the jointly developed LSI to other mobile phone manufacturers as well, and aims to be a market leader in this area.

Major features of the LSI are as follows.

- Compliant with 3GPP release 5 (as of September 2003).
- Supports HSDPA (external accelerator).
- Supports GSM/GPRS/EDGE and W-CDMA modes.
- Manufactured using leading edge 90nm process technology.

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Web Page Viewing on Variety of Terminals Made Easy through Web Page Layout Analysis Engine

NEC Corporation announced that it has succeeded in the development of a web page analysis engine that realizes ease of viewing of web pages on a variety of terminals, such as televisions, PDAs, and mobile phones, despite differences in display resolution and screen size.

The layout analysis engine enables extraction of a layout structure that meets with the viewer's needs instinctively. This is realized through the analysis of characteristics, such as the color, size, and position of the title and the multiple domains that constitute the web page, in addition to the formation of the HTML tag that defines the web page.

Enabling users to easily grasp an overview of the full contents of a web page and reducing the number of operations necessary to access sought-after infor-

mation, this technology achieves ease of viewing even on small screens such as on mobile phones. This is realized by displaying digest pages, which consist of only titles, and detailed pages, which display the full contents related to each title separately. Through this technology, the environment for web viewing can be actively expanded from personal computers to include home TVs and mobile phones etc. In addition, the necessity for contents providers to create various web pages depending on the individual terminal will become a thing of the past, in turn contributing to a significant reduction in creation costs.

The main characteristics of the layout analysis engine are as follows:

- 1) Title extraction: Through the development of a

method for analyzing titles using styles, in addition to the types of HTML tags, the accurate extraction of web page title domains is enabled.

2) Layout analysis: Segmentation of web page display elements (blocks) is realized through the analysis of the HTML tag's structure and position. In addition, extraction of the layout structure is achieved through the grouping of titles and their multiple related blocks.

As internet use becomes more and more a part of our daily lives, the need for web viewing on a variety of terminals increases. In response to these needs, a few methods have been developed to convert HTML tags into tags for mobile phones. Conventionally, as contents of a webpage were simply divided up, grasping an overview of information was difficult and accessing sought-after information required many operations and involved moving from page to page. This can be timely and frustrating. This new layout analy-

sis engine will enable quick and easy access to information. By combining this technology with NEC's own original display technology "semantic zoom" the automatic generation of web pages offering the same ease of display on small screens is enabled.

NEC will continue this research toward commercialization, and it also aims to improve accessibility through R&D in voice read over software technologies etc. These technologies will all contribute to the active use of mobile phones toward mobile offices, and smart homes that actively use the internet.

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*Semantic Zoom function enables ease of viewing of web pages on lower resolution terminals such as TVs, PDAs and mobile phones as compared with PCs, by installing original software on terminals. Even on smaller screens web pages can be viewed comfortably since the terminal can omit irrelevant information by determining heading and title through layout structure information given as XML data.

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NEC Develops World's First 3-Generation-Compatible HD DVD Drive

NEC Corporation announced that it has completed the development of technology capable of playing back HD DVDs, DVDs, and CDs with a single optical head, enabling creation of the world's first half height size drive suitable for desktop computer installation.

The main features of this prototype drive are as follows:

(1) Realization of Three-Wavelength-Compatible Optical Head

- This compatible head technology was developed by using three lasers, the blue, red and infrared laser diodes ("LD"), as the light source, thus enabling optimal reading of each disc through the optical head using a single objective lens.
- Correction of the difference in substrate thickness and wavelength, which causes spherical aberration, was corrected by changing the magnification of the objective lens. Control of the numerical aperture of the objective lens corresponding to each disc format is enabled by an aperture control element that features wavelength selectivity, which realizes stable reading.

(2) Realization of 3-Generation-Compatible System LSI

- Compatibility function and system operation was achieved by overcoming the physical format difference between CD, DVD and HD DVD through the development of system LSI.

(3) Half Height Size Capable of Installation in Desktop PCs

- Realization of the completed prototype by integration of all the functions compactly including the 3-generation compatible optical head.
- Reduction of the size to meet those of the average current DVD/CD compatible drives through the development of a compact circuit board utilizing 3-generation-compatible system LSI.

(4) Realization of Stable Operation on the Compatible Drive

- In order to achieve not only high density and large capacity but also stable operation for HD DVDs, an adaptive PRML system was developed, and an ETM modulation code was adopted. The ETM code is suitable for the PRML system. By adoption of this adaptive PRML system and ETM code,

amplitude margin deterioration is compensated for by stable high-density playback operation.

- Drive operation for DVDs and CDs is realized through maximum exertion of current DVD/CD compatible drive firmware technology and LSI technology, which was developed for the present DVD combo drive business.

The development of drive firmware technology, system LSI technology and HD DVD/DVD/CD-compatible optical head technology enables realization of a compact HD DVD drive and its ease of incorporation into personal computers.

Recently, high-definition contents are increasing with the spread of high definition, large screen displays, and the start of digital terrestrial TV broadcasting etc. It is anticipated that the need for recording and playing back high-definition digital contents on optical discs in the home and on personal computers will continue to grow.

NEC and Toshiba have proposed the “HD DVD” format, which has blue LDs as its light source, to the DVD Forum, based on the concept that compatibility with present DVD discs, which has spread rapidly, is of great importance for the spread of next-generation optical discs capable of recording and playing back high-definition video. The DVD Forum has already approved the HD DVD-ROM and Rewritable disc formats. The HD DVD-recordable format was approved in September, 2004, in version 0.9. NEC, along with Memory-Tech Corporation, SANYO Electric Co., Ltd. and Toshiba Corporation, are currently making progress with preparations to get the HD DVD Pro-

motion Group underway in order to aid the spread of these formats, and it is expanding its activities such as collaborative promotion at exhibitions etc.

In general, HD DVD employs blue LDs with shorter than conventional wavelength as its light source to enable higher recording density. In order to realize compatibility with current discs, such as CDs and DVDs, a large number of parts are required resulting in a large-sized drive. To date this has been one of the major challenges to overcome. NEC’s new development realizes a small, slim HD DVD drive, which can read and write 3-generations of optical discs, HD DVDs, DVDs and CDs, with a single optical head. NEC will continue advancing and accelerating its development toward commercialization of the HD DVD drive, in turn contributing to the spread of the HD DVD format.

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Photo 4 External view of HD DVD.

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Development of Low-Energy-Produced Flame Resistant Polycarbonate Using Fly Ash

NEC Corporation announced that it has succeeded in the development of a flame resistant polycarbonate resin, which cuts manufacturing energy consumption by over 20% through the use of fly ash that is a by-product of thermal power plants. The fly ash boasts a high level of flame resistance necessary for housing plastics in electronic products such as in PCs, without the addition of toxic materials such as halogen compounds that are conventionally found in housing plastics. Use of fly ash results in a reduction in material costs, promotion of the protection of the environment thanks to safety measures regarding the elimination of the use of halogen compounds, and a reduction in

manufacturing energy consumption.

The fly ash used in this research is a by-product of thermal power plants, and although it has been used as a cheap source material for cement, etc, it has to date not been effectively used as a component in housing materials. NEC has discovered the flame resistance properties of the fly ash for polycarbonate resin as a result of repeated research surrounding high reactivity on the fly ash surface. The flame resistance is due to the strong adhesion of the fly ash to the polycarbonate resin, which enhances thermal degradation resistance of the resin, and in addition, promotes its carbonization.

This research, through the optimization of the added volume and particle size of the fly ash, as well as the original composition of additives including a fluidity-enhancing agent, along with the ability to control the decrease of the strength and fluidity of the polycarbonate resin when the fly ash is added, provides an environmentally friendly flame resistant polycarbonate resin that can be used in desktop electronic equipment.

Furthermore, in addition to the elimination of the use of toxic materials and a reduction in manufacturing energy consumption, the flame resistant polycarbonate resin realizes a reduction in basic material

costs, contributing to the expansion of the spread of environmentally friendly materials.

NEC is strengthening its R&D in this field toward practical use of the new material in housings of electronic products in the Japan market within 2005.

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*i-mode is a registered trademark of NTT DoCoMo, Inc.

†Other names of companies and products introduced in articles are trademarks or registered trademarks of each company.

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