

2010 C&C Prizes Ceremony

NEC C&C Foundation (President Hajime Sasaki, Executive Advisor of NEC Corporation) was established as a nonprofit organization by funding of NEC Corporation in March 1985. The objective of the foundation is to foster further growth in the electronics industry by encouraging and supporting research and development activities and by pioneering works related to the integration of computers and communications (C&C) technologies and ultimately to contribute to the world economy and the enrichment of human life.

The activities deployed by the foundation in order to achieve this objective include; 1) Awards (C&C Prizes and Outstanding Paper Award for Young C&C Researchers) and; 2) Grants (grants for Japanese researchers to attend international conferences overseas and grants for non-Japanese researchers in Japan, etc.).

The 2010 C&C Prizes and 25th Anniversary Memorial Award Ceremony was held at the ANA Intercontinental Hotel Tokyo on Wednesday November 24, 2010.

In the welcoming speech, President Hajime Sasaki introduced the NEC C&C Foundation and reported that the number of C&C Prize recipients had totaled 85 by 2010, that the 25th Anniversary Memorial Award is established to commemorate the 25th anniversary of the foundation. He also reported that the foundation is expected to be authorized as a public interest incorporated foundation by the Cabinet Office of Japan.

At the ceremony, the C&C Prizes were presented to three recipients of two groups, while the 25th Anniversary Award was given to two researchers.

The C&C Prize for Group A was presented to Drs. Hiroyuki Sakaki and Yasuhiko Arakawa (**Photo 1**) for their “pioneering and leading contributions to the research, development and progress of quantum wire and quantum dot semiconductor devices.” The two doctors made pioneering theoretical proposals on applying ultra-small semiconductor structures, namely, quantum wires and quantum dots, to advanced devices such as field-effect transistors (FETs) and semiconductor lasers, and predicted

that their performances and characteristics would be dramatically improved. These proposals resulted in quantum wire FETs and quantum dot lasers due to subsequent advances in nano-fabrication technology. In particular, quantum dot lasers have reached the level of practical use and commercialization, and are expected to enjoy significant growth. Moreover, their works on quantum dots and wires led to the births of a set of devices having new functions and higher performance, such as those based on the control and use of a single-electron or a single-photon.

The recipient of the C&C Prize for Group B was Dr. Linus Torvalds (**Photo 2**), who received the prize for the “creation of the Linux kernel and the promotion of open-source operating system development.” In 1991 Dr. Torvalds developed Linux as an operating system (OS) having functions interchangeable with those of UNIX, which had been in use for years. Linux was released to the public as open-source software, becoming a new type of software development platform available for anyone to utilize freely. Owing to this open-source approach to software, Linux was not only used as an OS for personal computers but also widely adopted for information technology devices ranging from built-in equipment such as for cellular phones and consumer electronics to mainframes and supercomputers. Therefore, it greatly contributed to the development and progress of today's information technology devices.

After the award presentation, Dr. Sakaki gave an acceptance speech entitled “Quantum confinement of electrons using nanostructured thin films, wires, and dots and the search for their applications in advanced devices.” This was followed by an acceptance speech entitled “30 Years of Quantum Dot Research” delivered by Dr. Arakawa. The speech made by Dr. Torvalds in Group B included details of the circumstances that led him to be interested in the world of programming. Recently he is spending most of his time in “the development of tools for communications across the boundaries between organizations and engineers that are globally dispersed.”



Photo 1 President Sasaki, Dr. Sakaki and Dr. Arakawa (From Left to Right).

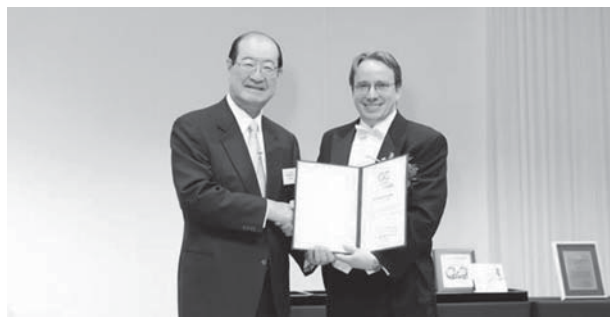


Photo 2 Dr. Linus Torvalds (Right).

NEC C&C Foundation 25th Anniversary Memorial Award

The NEC C&C Foundation 25th Anniversary Memorial Award was presented following the 2010 C&C Prizes.

The 25th Anniversary Memorial Award was given to Drs. Kuninori Uesugi (**Photo 1**) and Jun'ichiro Kawaguchi (**Photo 2**) for the development of systems technologies for "HAYABUSA" comprising communications and control technologies as their core, enabling the unmanned craft to land and take off from an extraterrestrial object (the asteroid Itokawa) and return to earth for the first time in history.

In their acceptance speeches (refer to **Fig. 1** and **Fig. 2**), the doctors reported that the MUSES-C project accom-

plished the perfect score marks of 500 points for the five series of critical missions. Such inspiring results are made possible by applying "system autonomy," that would not have been possible without the powerful aid of Computers & Communications." They also added that their achievement was thanks to "the sustained activity of turning luck into skill and confirming its effectiveness." Before closing their speeches they emphasized the importance of "handing down proven technologies to an increasing number of young researchers and the need to sustain investments, even if the risk is high."



Photo 1 Dr. Kuninori Uesugi (Right) with President Hajime Sasaki.



Photo 2 Dr. Jun'ichiro Kawaguchi (Right) with President Hajime Sasaki.

Mission Achievement Score of the MUSES-C Project (Scoring out of 100 points)

Electrical propulsion engines – Startup and operation (∵A world first 3-engine operation)	50 points
Electrical propulsion engines – Operation for more than the specified period (1000 hrs.)	100 points
Earth swing-by (∵World-first swing-by using electrical propulsion engines.	150 points
Rendezvous with asteroid 1998SF36, ITOKAWA (employing autonomous navigation)	200 points
Scientific observation of an asteroid	250 points
Touchdown with asteroid and sample collection	300 points
Return to Earth, reentry to the earth's atmosphere and recovery of capsule	400 points
Obtaining asteroid samples	500 points

Method of evaluation of the "execution of a series of five missions in a single probe"

Fig. 1 Part of the lecture material used by Dr. Uesugi.

Asteroid Exploration Mission MUSES-C, HAYABUSA

Objective: Technology demonstration of "sample return," which is the ultimate step of "exploration"

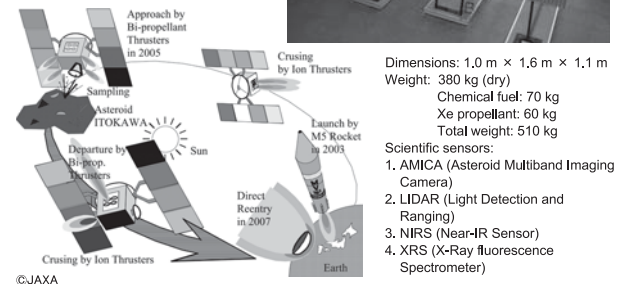


Fig. 2 Part of the lecture material used by Dr. Kawaguchi.

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Strategies aimed at the Entry of Space Systems Business Enterprise to the Global Market

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Development of the ASNARO, an Advanced Space System

Technologies/Products supporting roadmap implementation (Satellites/Space station)

Development of the Japanese Experiment Module (JEM), KIBO for the International Space Station

Development of the Venus Climate Orbiter PLANET-C (AKATSUKI)

Development of Small Solar Power Sail Demonstrator IKAROS

Development of the KAGUYA (SELENE), a Lunar Orbital Spacecraft

Development of the Earth Observation Satellite "DAICHI" (ALOS)

Development of the Wideband InterNetworking Satellite WINDS (KIZUNA)

Small SAR Satellite Technology Promotes Dissemination of a Comprehensive Space Utilization System

Technologies/Products supporting roadmap implementation (Satellite ground system)

Ground Systems Supporting Satellite Operations

Data Processing System for Advance of Earth Observation Data

Technologies/Products supporting roadmap implementation (Satellite Bus)

NEXTAR Standard Platform for Quick Startup of Remote Sensing Operations

Standard Components of Satellite-borne Equipment

Technologies/Products supporting roadmap implementation (Communication)

Communications Technologies Supporting Satellite Communications

Satellite Transponder Equipment in Active Worldwide Use

Technologies/Products supporting roadmap implementation (Observation sensors)

Optical Sensor Technology Supporting the Greenhouse Gases Observing Satellite (GOSAT, or IBUKI)

Radio Frequency Sensor Technology for Global Rain and Cloud Observation

SAR Image Processing Technologies are Improving Remote Sensing Data

An Industrial Waste Monitoring System Based On the Use of Satellite Images

Technologies/Products supporting roadmap implementation (Fundamental technologies)

Fundamental Space-Supporting Technologies and Their Development Process

Element Technologies for Trajectory Design for Lunar/Planetary Exploration

Development of a Radiation-Hardened POL DC/DC Converter for Space Applications

Qualification Situation and Future Deployment of PWBs for Space Development Use

Technologies/Products supporting roadmap implementation (Guidance control computer)

Guidance Control Computer for Launch Vehicle

Asteroid probe MUSES-C (HAYABUSA)

Results Achieved from the Development and Operation of the Asteroid Probe MUSES-C (HAYABUSA)

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NEWS

2010 C&C Prizes Ceremony

NEC C&C Foundation 25th Anniversary Memorial Award



Vol.6 No.1

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Special Issue TOP