NEC Group Intellectual Asset Strategy

~The Key to Our Sustainable Growth~

The NEC Group is committed to grow by pursuing our business with the "trinity" integration of management strategy, R&D strategy and intellectual asset strategy. For achieving this goal, maximizing the value of our intellectual assets is important by securing patents in close coordination with our business and technological development activities. In order to realize this, we have reorganized the Intellectual Asset Management Unit to strengthen the strategic patent portfolio creation and to pursuit our operation on a global scope. At the same time, we are conducting various activities such as projects to promote the creation of powerful patents for the domains of strategic technological areas and growing business field.

With the aim of furthering the advance of NEC business activities on the global stage with innovation, we are ensuring that the scale and scope of our intellectual asset operations are sufficient to meet this task. For conducting patent application and maintenance activities that are consistent with our intellectual asset strategy, we are improving the related infrastructure, and fostering and reinforcing our human resources.

EMURA Katsumi
Executive General Manager,
Intellectual Asset Management Unit

1 NEC Intellectual Asset Operations Policy: "Keep Our Business and Technology Edge Sharp"

Today "information" has become the nucleus of business, and the promotion of the creation, protection and exploitation of intellectual assets is becoming indispensable to driving sound business and corporate growth.

In the NEC Group, we are undertaking activities that aim at maximizing the value of our intellectual assets as an important base that supports the sustainable growth of our business.

Fundamental to these operations is advancing an intellectual asset strategy that is tightly integrated with both our business/management and R&D strategies. While it is important to secure intellectual assets necessary for research and development activities, which are in turn driven by the business strategy, it also vital to dynamically propel business forward based on a review of business and R&D strategies from the perspective of intellectual assets. We believe that approaching our intellectual asset strategy from this standpoint leads to maximization of the value of the intellectual assets possessed by NEC (**Fig. 1**) .

The following are typical examples of how we are tackling this strategy.

(1) Improvement of the Structure to Facilitate the Creation of Strong Intellectual Assets

We have positioned a CPO (Chief Patent Officer) in all business units and research laboratories to bear responsibility for planning and execution of their respective intellectual asset strategy. Persons appointed to the position of CPO each are top-class human resources that have the ability to see the big picture

Fig. 1 Close interaction of the business/management, R&D and intellectual asset strategies.

of technology in the organization. For example, in the case of a CPO for the Central Research Laboratories, a person is assigned with the experience of conducting one of the laboratories as a general manager.

Taking into consideration the business and R&D strategy, the CPO formulates plans for patent applications for their strategic areas. Managing patents as a portfolio, the CPOs promote the creation of patents as a force for the protection of the business. CPOs throughout the company gather together periodically for a CPO conference during which they exchange views on the overall corporate policy governing intellectual asset operations and make resolutions on how to proceed in the future.

The formulation of strategy, support for patent creation, patent administration, patent exploitation, negotiations and other tasks related to NEC's corporate-wide intellectual asset operations are undertaken by the Intellectual Asset Management Unit. We are also promoting "collocation" activities that we dispatch our members to the place where the CPOs are physically located. The "collocation" members are responsible for supporting the creation of intellectual assets and their administration, and bear another title and related responsibilitiesin the respective business unit. Through this system, coordination and synergies among the CPO, the engineers who create the ideas and the researchers are strengthened, which promote the creation of powerful patents.

(2) Globalization of Intellectual Asset Operations

In step with the globalization of NEC Group business, it is important for intellectual asset operation to be undertaken on a global scale. Giving consideration to the business and market environment, it will naturally be important to undertake strategic patent applications in global countries. However, in order to promote intellectual asset operations that conform to the distinctive characteristics of each region, we have also established the following intellectual asset (IA) centers.

The China IA Center was established in Beijing in 2004. Among its many missions, it works to improve the intellectual property environment for our locally incorporated entities, resolve intellectual asset disputes, undertakes measures to combat counterfeit products and develop the intellectual asset business within China.

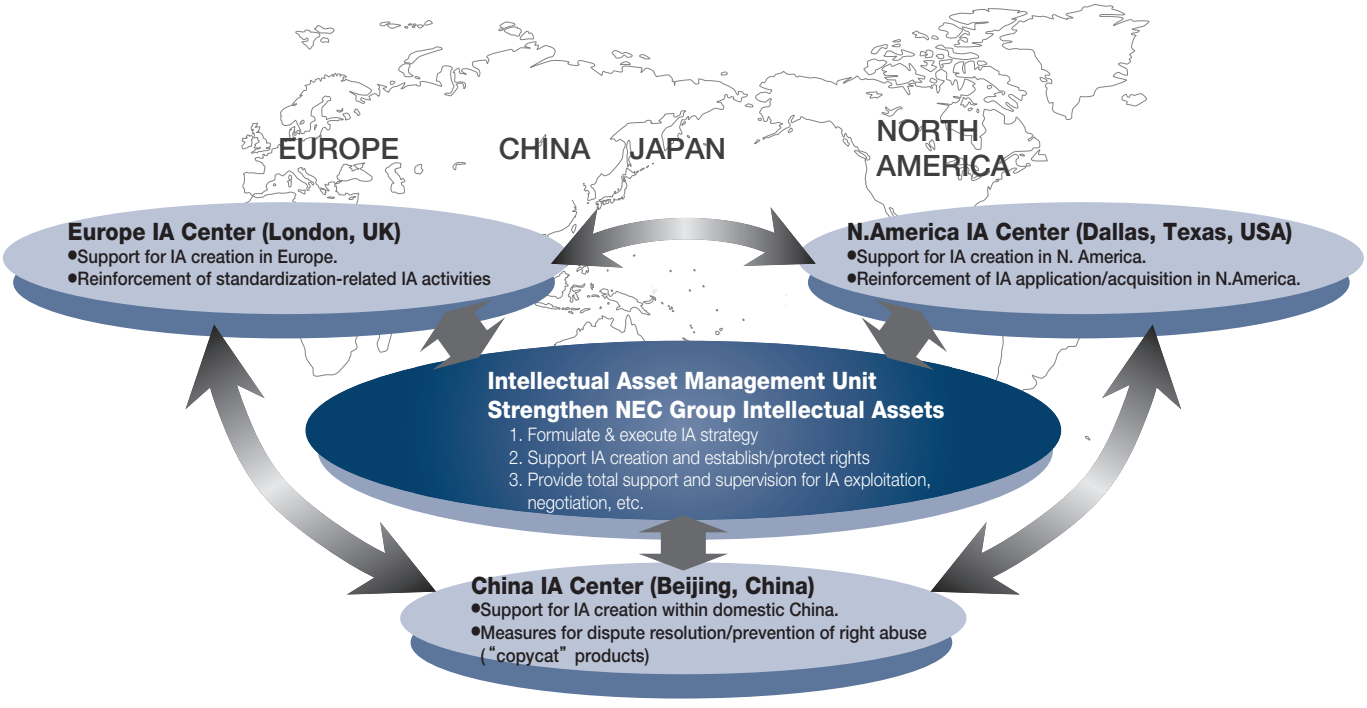

Fig. 2 Global intellectual asset operations.

Our IA Center for the European region was established in London, U.K. in early 2007 to provide a common intellectual asset base, support infrastructure of intellectual assets and strategy for NEC Group companies incorporated in the region, and to promote the reinforcement of standardization of related intellectual asset operations.

The North America IA Center was established in Dallas, Texas in autumn 2007. Reinforcement of intellectual asset operations of our locally incorporated entities and promotion of US patent application are some of the activities undertaken by this center.

With their establishment, we have completed a global network of four regional centers serving Japan, China, Europe and North America. In the future, as we strengthen the coordination between regions, we will promote activities to create and exploit intellectual assets on a global scope (**Fig. 2**).

2 Strategic Technologies and Growth Markets: "Promotion of IPR Project"

With the aim of owning strong patents in strategically important business areas and technologies, NEC Group is making steady progress with its IPR Project for Strategic Technologies. Serving as a venue where maximum synergies can be generated from the concerned parties, this project plays very vital role in the future of NEC. Representative examples are explained below.

(1) Network-Related Aspects

In the mobile technologies and especially in the domain of B3G (Beyond 3rd Generation), we have adopted a project-style approach to the creation of important patents in coordination with standardization activities (partner building).

In the network-related technologies, NEC is driving its business with the vision of the NGN (Next Generation Network) as the keystone to our strategy. Accordingly, we also plan to aggressively pursue IPR Project activities in this domain of business in the future.

(2) Security, Ubiquity and Other Needs

Leveraging the unique strengths of NEC Group, we will use this project to acquire patents related to security, ubiquitous terminals and other technologies that will be indispensable for the advance of the coming Ubiquitous Network Society.

3 Future Directions

Through the 1990s, NEC was ranked in among the top in terms of "quantity" of patent applications in Japan. Subsequently, we shifted our focus to the "quality" of patent applications, specifically putting a priority on patents linked with business - a policy that remains in effect today.

In the future, we will pursue these activities, continuing to constantly monitor the state of global development, market trends and competitor trends while always keeping in mind the revenues and expenditures related to patent creation/acquisition and performing an annual review and clarification of the patent application policy from the perspective of the NEC Group. We expect that the overall total number of patent applications will trend upwards during the next several years.

With Innovation as the nucleus of our group, NEC will undertake business on a global scale. In step with our further advance into world markets, we have adopted a policy that devotes our strength into making our intellectual asset operations more robust than ever before and able to meet this challenge. While fostering internal human resources, we will reinforce our collaboration with external agents and concerned parties with the aim of creating and exploiting better patents. We also plan to adopt other measures such as building a patent administration system to support effective application for strategic patents and bolstering our invention compensation system.

The environment surrounding patents is evolving. Always with a firm grasp of trends from a global perspective, our Intellectual Asset Management Unit will develop and move forward in step with the advance of the NEC Group on the world stage, and we hope that you will continue to watch our activities with interest and lend us your support and encouragement.

Our "Material for Chemically Amplified Photoresist" Awarded "Special Prize for National Invention Award of 2007"

The "material for chemically amplified photoresist," developed by the Central Research Laboratories of NEC, was awarded the "Nippon Keidanren (Japan Business Federation) Chairman's Invention Award," which is one of the special prizes of the "National Invention Award of 2007." We would like to introduce this material to readers as an example of our highly evaluated intellectual property related activities.

Summary of Award

●Award name

"Special Prize" for the national invention award of 2007
Nippon Keidanren Chairman's Invention Award
Invention of material for chemically amplified photoresist

●Award recipients

Nano Electronics Research Laboratories
Dr. Katsumi Maeda, Senior Researcher
Dr. Shigeyuki Iwasa, Senior Researcher
Dr. Kaichiro Nakano, Senior Researcher
Dr. Etsuo Hasegawa, Senior Manager

●Awarded theme

Invention of material for chemically amplified photoresist

●Awarded Patent

Japan Patent 3042618 (US Patent 7,186,495)

Photo Award recipients
(from left to right, Nakano, Maeda, Iwasa and Hasegawa).

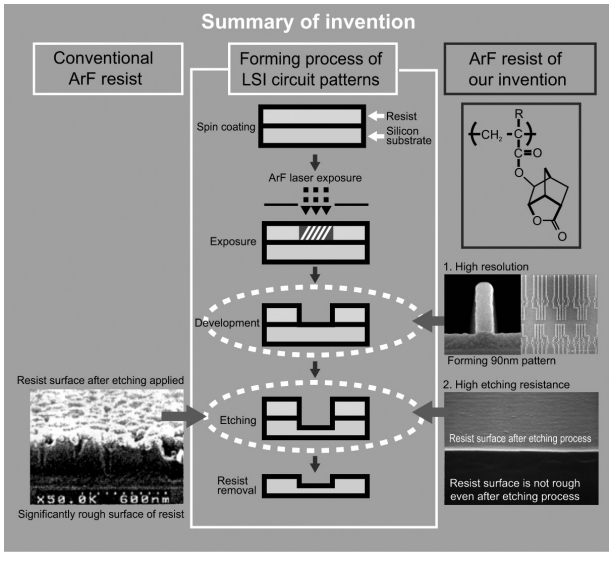

Fig. Summary of invention.

Summary for Invention of "Material for Chemically Amplified Photoresist"

This invention relates to the material used in manufacturing chemically amplified photoresist*1, used for the production of semiconductor integrated circuits (LSIs), particularly those base materials used in manufacturing photoresist for ArF excimer laser exposure with a wavelength of 193nm.

Photoresist, a photosensitive material, is used to form minutely fine circuit patterns of LSIs on silicon substrates. Photoresist is a key material for realizing high-density integrated LSIs.

High transparency at exposure light and superior dry etching resistance, as well as a high resolution and even superior adhesion on substrates, are required of photoresist materials. None of the conventional photoresist materials, however, could satisfy all of the required performance items for the manufacture of advanced LSIs with minimum feature sizes below 90nm by ArF excimer laser lithography. A new photoresist material for ArF lithography, therefore, was needed to be developed.

It is for this reason that we invented an acrylate polymer with a completely new structure. This polymer has an alicyclic group providing high transparency at ArF light and good dry-etching resistance characteristics. It also features a lactone unit which is effective for improving resolution and adhesion properties. We demonstrated that the newly invented material has superior characteristics as photoresist for ArF excimer laser lithography.

The invention of this material made possible mass production of the cutting edge LSIs of up to 90nm dimension for the first time and it is currently being considered for implementation with the manufacture of LSIs with 65nm, 45nm and 32nm design rules, making this invention a forerunner in technology for mass produced advanced LSIs in the future as well.

The invented material is currently being mass produced by chemical manufacturers and it is used for manufacturing advanced LSIs (with minimum feature size below 90nm) using ArF lithography throughout the world. The invention is contributing to the miniaturization and superior performance of electronic devices.

*1: Chemically amplified resist characteristically contains a chemical compound that generates a protonic acid by irradiation of light. It is possible to form patterns using less exposure energy in comparison with conventional resists.