UNITED STATES DEPARTMENT OF
COMMERCE
NEWS
WASHINGTON, D.C. 20230

OFFICE
OF THE
SECRETARY

FOR IMMEDIATE RELEASE:
Wednesday, October 15, 1997

CONTACT: Maria T. Cardona
202-482-4883

STATEMENT BY SECRETARY OF COMMERCE WILLIAM M. DALEY ON THE 1997 NOBEL PRIZE IN PHYSICS AWARD TO DR. WILLIAM PHILLIPS OF THE DEPARTMENT'S NAT'L INSTITUTE OF STANDARDS AND TECHNOLOGY

Washington -- Dr. Phillips' exceptional work highlights a key role of the Commerce Department in pushing the limits of measurement science and laying the foundations for the basic measurement technology support required by the U.S. science and industry. His research may lead to dramatically improved measurements of time and length likely to be needed by U.S. industry in the development of economically beneficial advanced technologies in the next century. I'm extremely proud that he is a long-time employee of the Commerce Department and that his extraordinary vision, talent and expertise are being recognized today throughout the world.

In sharing this year's Nobel prize in Physics, Dr. Phillips adds yet another laurel to the outstanding research record of the Department's National Institute of Standards and Technology.

Statement by Dr. William D. Phillips, National Institute of Standards and Technology:

I am thrilled to share in this prize* along with Steven Chu and Claude Cohen-Tannoudji. The joint award emphasizes that this work was not done in isolation. My colleagues in this field have influenced me profoundly and given me an enormous amount of help and stimulation. The research honored by this prize is the result of a huge effort by many other people. The vitality of the research environment at NIST and the scientific quality of my group have been essential to what we have accomplished.

Statement by Dr. Robert Hebner, Acting Director, National Institute of Standards and Technology, on the award of the 1997 Nobel Prize in Physics to Dr. William D. Phillips of NIST*:

We're tremendously excited by this news and proud as can be to have Bill Phillips on the NIST staff. Achievements in science and technology that are so important to this nation and to our economy are limited by what we can achieve in measurement science. The elegant work that Bill and his colleagues have done at the frontiers of atomic measurement opens up new possibilities both in science and measurement technology.

Statement by Dr. Katharine Gebbie, Director, Physics Laboratory, National Institute of Standards and Technology:

This is a wonderful honor for Bill Phillips, for his colleagues in the Physics Laboratory, and for NIST. Bill is an extremely talented and special person. Those who have worked with him or heard him speak are keenly aware of his passion for physics. His pioneering work in laser cooling and trapping of atoms has formed the basis for many advances in measurement science and standards. Current applications of importance to science and technology include atomic clocks, atom lasers, atom optics and atomic lithography. We are delighted that Bill has shared this prize with Steven Chu and Claude Cohen-Tannoudji, and we wish them all the very best in their future endeavors.

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* The Nobel Prize in Physics was awarded jointly to William D. Phillips, Professor Steven Chu of Stanford University, and Professor Claude Cohen-Tannoudji of the Collège de France and the École Normale Supérieure.

October 15, 1997

UNITED STATES DEPARTMENT OF
COMMERCE
NEWS
GAITHERSBURG, MD 20899

NATIONAL INSTITUTE
OF STANDARDS
AND TECHNOLOGY

FOR IMMEDIATE RELEASE:
May 13, 1997

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TN-6136

NIST FELLOW WILLIAM D. PHILLIPS

ELECTED TO NATIONAL ACADEMY OF SCIENCE

William D. Phillips, a leading researcher in laser cooling of atoms at the National Institute of Standards and Technology, was elected to the National Academy of Sciences on April 29. Election to the NAS is considered one of the highest possible honors for a U.S. scientist or engineer.

Phillips, a resident of Gaithersburg and a NIST Fellow since 1996, is internationally known for advancing basic knowledge and new techniques to chill atoms to extremely low temperatures. The cooling and trapping of atoms, a discipline that emerged in the mid-1970s with the advent of laboratory lasers, has allowed scientists to observe and measure quantum phenomena in atoms that seem to defy the physical principles governing our tangible room-temperature realm.

After earning his Ph.D. in physics and completing post-doctoral research at the Massachusetts Institute of Technology, Phillips came to NIST (then the National Bureau of Standards) in 1978 to work in the Electricity Division. While at MIT, Phillips had completed two thesis experiments, one in the well-established area of magnetic resonance and the other with newly available tunable laboratory lasers.

His official duties at NBS originally were related to his first thesis experiment, involving precision electrical measurements. However, he explains, he was allowed to use "stolen moments to dabble in laser-cooling" with lab equipment he brought from

-more-

MIT. With encouragement from NBS management, he continued experiments and demonstrated that a beam of neutral atoms could be slowed and cooled with radiation pressure from a laser.

NIST's accomplished and internationally recognized laser cooling and trapped atom research program grew out of these early experiments. Phillips and the team he built have made numerous pivotal contributions to the field. For example, in the mid-1980s, Phillips' team found serious discrepancies between its own measurements and the generally accepted "Doppler cooling limit." They demonstrated that it was actually possible to chill atoms well below the accepted limits down to a few microKelvins, or just millionths of a degree above absolute zero. This discovery paved the way for scientists seeking to create Bose-Einstein condensation, an exotic new form of matter in which atoms all fall into their lowest energy levels and merge into a single quantum state. In the summer of 1995, a NIST/University of Colorado group in Boulder, Colo., announced the creation of the first Bose-Einstein condensate.

Phillips and his team are continuing to study ultra-cold trapped atoms with spin-off applications for improved accuracy in atomic clocks and in fabrication of nanostructures. For the latter, Phillips envisions using light to focus an atom laser to create what might be the basis of a next generation of ultra-small structures for electronic circuits.

"All of the people who have been members of this group over the years have made incredible contributions. It's been a fantastic experience," Phillips says. "This isn't something that I did. It's something that we did. We were there to take advantage of the lucky breaks that we got."

Phillips, originally from Pennsylvania, was elected with 59 other new members and 16 foreign associates from 11 countries in recognition of distinguished and continuing achievements in original research. Phillips, his wife and two children live in Gaithersburg, Md.

The National Academy of Sciences is a private organization of scientists and engineers dedicated to the furtherance of science and its use for the general welfare. The NAS was established in 1863 by a congressional act of incorporation, signed by Abraham Lincoln, that calls on the academy to act as an official advisor to the federal government, upon request, in any matter of science or technology.

As a non-regulatory agency of the Commerce Department's Technology Administration, NIST promotes U.S. economic growth by working with industry to develop and apply technology, measurements and standards.

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News and general information on the National Institute of Standards and Technology are available on the World Wide Web via Internet at http://www.nist.gov.

KUNGLIGA
VETENSKAPSAKADEMIEN
THE ROYAL SWEDISH ACADEMY OF SCIENCES

15 October 1997
The Secretary General
Professor Erling Norrby/ks

Dr. William D. Phillips
National Institute of Standards
and Technology
Gaithersburg, MD 20899
USA

Dear Dr. Phillips,

Hereby I have the honour and pleasure to confirm in writing that the Royal Swedish Academy of Sciences has decided to award the 1997 Nobel Prize in Physics jointly to you, Professor Steven Chu, Stanford University, Stanford, California, USA, and Professor Claude Cohen-Tannoudji, Collège de France and Ecole Normale Supérieure, Paris, France, for development of methods to cool and trap atoms with laser light.

On behalf of the Academy I congratulate you warmly and look forward to meeting you when you come to Stockholm to receive your Prize from the hands of His Majesty the King on December 10th.

According to the statutes of the Nobel Foundation, each Laureate is required to give a lecture within six months after the day the award was presented to him. The subject of the lecture should be on, or associated with, the work for which the Prize was awarded and will be published in "Les Prix Nobel". In accordance with the tradition laureates give their lectures during the visit in Stockholm in December. The 1997 lectures in physics will take place at the Royal Swedish Academy of Sciences on December 8th. Will you kindly let me know the title of your lecture at your earliest convenience but not later than October 31st. It should last about 45 minutes. There will be no discussion. You may expect an audience of not only trained scientists, but of students and other interested persons as well. Please let us know what kind of technical arrangements you need (slide projection etc.).

In the afternoon of December 7th there will be a press conference including all our Laureates.

On the same day, December 7th at 5.00 p.m., the Academy gives a reception in honour of you and the other Laureates in Physics, Chemistry and Economic Sciences and their families. I am also pleased to invite you and your wife to a dinner following the

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reception at the Academy to meet the other Laureates and the Members of the Nobel Committees and their wives. This will be an informal gathering that I hope you and your wife will enjoy as a prelude to subsequent events.

I hope to hear from you soon about your lecture and the invitations to the reception and the dinner. It will be a pleasure to host you during your Stockholm visit. The office of the Nobel Foundation is responsible for the other arrrangements during the Nobel week and will contact you directly to inform you about the programme. All correspondence about these other arrangements should be directed to the office of the Foundation.

Yours sincerelly,

Erling Norrby

Erling Norrby

cc: The Nobel Foundation.

Information

Further information is available at the Royal Swedish Academy of Sciences, Information Department,
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This press release is also available in Swedish

The Royal Swedish Academy of Sciences has decided to award **the 1997 Nobel Prize in Physics** jointly to

Professor **Steven Chu**, Stanford University, Stanford, California, USA,
Professor **Claude Cohen-Tannoudji**, Collège de France and École Normale Supérieure, Paris, France, and
Dr. **William D. Phillips**, National Institute of Standards and Technology, Gaithersburg, Maryland, USA,

for development of methods to cool and trap atoms with laser light.

Atoms floating in optical molasses

At room temperature the atoms and molecules of which the air consists move in different directions at a speed of about 4,000 km/hr. It is hard to study these atoms and molecules because they disappear all too quickly from the area being observed. By lowering the temperature one can reduce the speed, but the problem is that when gases are cooled down they normally first condense into liquids and then freeze into a solid form. In liquids and solid bodies, study is made more difficult by the fact that single atoms and molecules get too close to one another. If, however, the process takes place in a vacuum the density can be kept low enough to avoid condensation and freezing. But even a temperature as low as -270°C involves speeds of about 400 km/hr. Only as one approaches absolute zero (-273°C) does the speed fall greatly. When the temperature is one-millionth of a degree from this point (termed 1 μK, microkelvin) free hydrogen atoms, for example, move at speeds of less than 1 km/hr (= 25 cm/s).

Steven Chu, Claude Cohen-Tannoudji, and **William D. Phillips** have developed methods of using laser light to cool gases to the μK temperature range and keeping the chilled atoms floating or captured in different kinds of "atom traps". The laser light functions as a thick liquid, dubbed optical molasses, in which the atoms are slowed down. Individual atoms can be studied there with very great accuracy and their inner structure can be determined. As more and more atoms are captured in the same volume a thin gas forms, and its properties can be studied in detail. The new methods of investigation that the Nobel Laureates have developed have contributed greatly to increasing our knowledge of the interplay between radiation and matter. In particular, they have

opened the way to a deeper understanding of the quantum-physical behaviour of gases at low temperatures. The methods may lead to the design of more precise atomic clocks for use in, e.g., space navigation and accurate determination of position. A start has also been made on the design of atomic interferometers with which, e.g., very precise measurements of gravitational forces can be made, and atomic lasers, which may be used in the future to manufacture very small electronic components.

Slowing down atoms with photons

Light may be described as a stream of particles, photons. Photons have no mass in the normal sense but, just like a curling stone sliding along the ice they have a certain momentum. A curling stone that collides with an identical stone can transfer all its momentum (mass times velocity) to that stone and itself become stationary. Similarly, a photon that collides with an atom can transfer all its momentum to that atom. For this to happen the photon must have the right energy, which is the same as saying that the light must have the right frequency, or colour. This is because the energy of the photon is proportional to the frequency of the light, which in turn determines the latter's colour. Thus red light consists of photons with lower energy than those of blue light.

What determines the right energy for photons to be able to affect atoms is the inner structure (energy levels) of the atoms. If an atom moves the conditions change because of what is termed the Doppler effect - the same effect that gives a train whistle a higher pitch when the train is approaching than when it is standing still. If the atom is moving towards the light, the light must have a lower frequency than that required for a stationary atom if it is to be "heard" by the atom. Assume that the atom is moving in the opposite direction of the light at a considerable speed and is struck by a stream of photons. If the photons have the right energy the atom will be able to absorb one of them and take over its energy and its momentum. The atom will then be slowed down somewhat. After an extremely short time, normally around a hundred-millionth of a second, the retarded atom emits a photon. The atom can now immediately absorb a new photon from the oncoming stream. The emitted photon also has a momentum, which gives the atom a certain small recoil velocity. But the direction of the recoil varies at random, so that after many absorptions and emissions the speed of the atom has diminished considerably. To slow down an atom an intensive laser beam is needed. Under the right conditions effects can be achieved with a strength corresponding to what would be seen if a ball was thrown upwards from the surface of a planet with a gravity 100,000 times the Earth's.

Doppler cooling and optical molasses

The slowing down effect described above forms the basis for a powerful method of cooling atoms with laser light. The method was developed around 1985 by **Steven Chu** and his co-workers at the Bell Laboratories in Holmdel, New Jersey. They used six laser beams opposed in pairs and arranged in three directions at right angles to each other. Sodium atoms from a beam in vacuum were first stopped by an opposed laser beam and then conducted to the intersection of the six cooling laser beams. The light in all six laser beams was slightly red-shifted compared with the characteristic colour absorbed by a stationary sodium atom. The effect was that whichever direction the sodium atoms tried to move they were met by photons of the right energy and pushed back into the area where the six laser beams intersected. At that point there formed what to the naked eye looked like a glowing cloud the size of a pea, consisting of about a million chilled atoms. This type of cooling was named Doppler cooling.

At the intersection of the laser beams, atoms move as in thick liquid, and the name optical molasses was coined. To calculate the temperature of the atoms cooled in the optical molasses the lasers were switched off. It was found that the temperature was about 240 μK. This corresponds to a sodium atom speed of about 30 cm/s, and agreed very well with a theoretically calculated temperature - the Doppler limit - then considered the lowest temperature that could be reached with Doppler cooling.

The atoms in the above experiment are cooled, but not captured. Gravity causes them to fall out of the optical molasses in about one second. To really capture atoms, a trap is required, and a highly efficient one was constructed in 1987. It was called a magneto-optical trap (MOT). It uses six laser beams in the same sort of array as in the experiment described above, but has in addition two magnetic coils that give a slightly varying magnetic field with a minimum in the area where the beams intersect. Since the magnetic field affects the atoms' characteristic energy levels (the Zeeman effect) a force will develop which is greater than gravity and which therefore draws the atoms in to the middle of the trap. The atoms are now really caught, and can be studied or used for experiments.

Doppler limit broken

Magnetic fields had already been used at the beginning of the 1980s by **William D. Phillips** and his co-workers in a method of slowing down and completely stopping atoms in slow atomic beams. Phillips had developed what was termed a Zeeman slower, a coil with a varying magnetic field, along the axis of which atoms could be retarded by an opposed laser beam. With his device Phillips had in 1985 stopped and captured sodium atoms in a purely magnetic trap. Enclosure in this trap, however, is relatively weak, for which reason the atoms within it must be extremely cold to remain inside. When Chu managed to cool atoms in optical molasses Phillips designed a similar experiment and started a systematic study of the temperature of the atoms in the molasses. He developed several new methods of measuring the temperature, including one in which the atoms are allowed to fall under the influence of gravity, the curve of their fall being determined with the help of a measuring laser.

Phillips found in 1988 that a temperature as low as 40μK could be attained. This value was six times lower than the theoretically calculated Doppler limit! It turned out that the Doppler limit had been calculated for a simplified model atom that had previously been considered sufficiently realistic. However, **Claude Cohen-Tannoudji** and his co-workers at the École Normale Supérieure in Paris had already in theoretical works studied more complicated cooling schemes. The explanation of Phillips' result lay in the structure of the lowest energy levels of the sodium atom. What happens can be likened to Sisyphus' endlessly rolling his stone up the slope, but in this case finding that the slope beyond the crest is also an uphill one. The comparison has led to the process being termed Sisyphus cooling.

The recoil velocity an atom gains when it emits a single photon corresponds to a temperature termed the recoil limit. For sodium atoms the recoil limit is 2.4 μK and for the somewhat heavier cesium atoms about 0.2 μK. In collaboration with Cohen-Tannoudji and his Paris colleagues Phillips showed that cesium atoms could be cooled in optical molasses to about ten times the recoil limit, i.e. to about 2 μK. It first appeared that in optical molasses it was generally possible to reach temperatures only about ten times higher than the recoil limit. In a later development both Phillips and the Paris group have showed that with suitable laser settings it is possible to trap the atoms so that they group at regular intervals in space, forming what is termed an optical lattice. The atom groupings in the lattice occur at distances of one light wavelength from each other. Atoms in an optical lattice can, as has been shown, be cooled to about five times higher temperature than the recoil limit.

Recoil limit also broken

The reason why the recoil velocity an atom obtains from a single photon sets a limit to both Doppler cooling and Sisyphus cooling is that even the slowest atoms are continually being forced to absorb and emit photons. These processes give the atom a small but not negligible speed and hence the gas has a temperature. If the slowest atoms could be made to neglect all the photons in the optical molasses, perhaps lower temperatures could be reached. One mechanism through which a stationary atom can be caused to assume a "dark" state in which it does not absorb photons, was known. But a difficulty was to combine this method with laser cooling.

Claude Cohen-Tannoudji and his group between 1988 and 1995 developed a method based on use of the Doppler effect and which converts the slowest atoms to a dark state. He and his colleagues showed that the method functions in one, two and three dimensions. All his experiments use helium atoms, for which the recoil limit is 4 μK. In the first experiment two opposed laser beams were used and a one-dimensional velocity distribution was achieved which corresponded to half the recoil limit temperature. With four laser beams a two-dimensional velocity distribution was achieved, corresponding to a temperature of 0.25 μK, sixteen times lower than the recoil limit. Finally with six laser beams a state was attained in which the whole velocity distribution corresponded to a temperature of 0.18 μK. Under these conditions helium atoms crawl along at a speed of only about 2 cm/s!

Applications just round the corner

Intensive development is in progress concerning laser cooling and the capture of neutral atoms. Among other things, Chu has constructed an atomic fountain, in which laser-cooled atoms are sprayed up from a trap like jets of water. When the atoms turn at the top of their trajectory and start falling again, they are almost stationary. There they are exposed to microwave pulses that sense the atoms´ inner structure. With this technique it is believed that it will be possible to build atomic clocks with a hundredfold greater precision than at present. The technique rewarded this year also forms the basis for the discovery of Bose-Einstein condensation in atomic gases, a phenomenon that has attracted great interest.

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Further reading

Additional background material on the Nobel Prize in Physics 1997, The Royal Swedish Academy of Sciences, Internet: http://www.kva.se/phyback97.html

Cooling and Trapping Atoms, by W.D. Phillips and H.J. Metcalf, Scientific American, March 1987, p.36.

New Mechanisms for Laser Cooling, by C. N. Cohen-Tannoudji and W. D. Phillips, Physics Today, October 1990, p. 33.

Laser Trapping of Neutral Particles, by S. Chu, Scientific American, February 1992, p. 71.

Experimenters Cool Helium below Single-Photon Recoil Limit in Three Dimensions, by G. B. Lubkin, Physics Today, January 1996, p. 22.

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Steven Chu was born 1948 in St. Louis, Missouri, USA. American citizen. Doctoral degree in physics 1976 at the University of California, Berkeley. Theodore and Frances Geballe Professor of Humanities and Sciences at Stanford University 1990. Among other awards Chu received the 1993 King Faisal International Prize for Science (Physics) for development of the technique of laser-cooling and trapping atoms.

Professor **Steven Chu**
Physics Department
Stanford University
Stanford, CA 94305
USA

Claude Cohen-Tannoudji was born 1933 in Constantine, Algeria. French citizen. Doctoral degree in physics 1962 at the École Normale Supérieure in Paris. Professor at the Collège de France 1973. Member of, among other institutions, the Académie des Sciences (Paris). Among many prizes and distinctions Cohen-Tannoudji received the 1996 Quantum Electronics Prize (European Physical Society) for, among other things, his pioneering experiments on laser cooling and the trapping of atoms.

Professor **Claude Cohen-Tannoudji**
Laboratoire de Physique de École Normale Supérieure
24, Rue Lhomond
F-75231 Paris Cedex 05
France

William D. Phillips was born 1948 in Wilkes-Barre, Pennsylvania, USA. American citizen. Doctoral degree in physics in 1976 at the Massachusetts Institute of Technology, Cambridge, USA. Among other awards Phillips has received the 1996 Albert A. Michelson Medal (Franklin Institute) for his experimental demonstrations of laser cooling and atom trapping.

Dr. **William D. Phillips**
National Institute of Standards and Technology
Gaithersburg, MD 20899
USA

Background

KUNGL. VETENSKAPSAKADEMIEN
THE ROYAL SWEDISH ACADEMY OF SCIENCES

BALDRIGE QUALITY AWARDS FOR EDUCATION, HEALTHCARE SET FOR 1999

EMBARGOED FOR RELEASE:
Oct. 30, 1998

Contact: Jan Kosko
(301) 975-2767

NIST 98-23

Education and healthcare organizations will be eligible to take full advantage of the Malcolm Baldrige National Quality Award in 1999 as a result of legislation signed into law today by President Clinton and the recent passage of the 1999 federal appropriations bill, the Commerce Department's National Institute of Standards and Technology announced.

"I am delighted that education and healthcare organizations will now be able to be full partners in the Baldrige National Quality Program. These organizations can now apply for the Baldrige Award and share best practices with schools and healthcare providers around the country," Commerce Secretary William M. Daley said.

The 1999 appropriation for the Baldrige National Quality Program is $4.9 million, which includes $1.8 million for the new award categories for education and healthcare. The expansions are authorized formally by the "Technology Administration Act of 1998," signed by the President today. Non-profit and for-profit education organizations and healthcare providers will be eligible to apply for the new awards. Manufacturers of healthcare equipment still will apply in the award's manufacturing category. Other categories for the Baldrige Award are service and small business.

In May 1997, the private Foundation for the Malcolm Baldrige National Quality Award announced a $15 million fund drive to raise an endowment to help establish an award program for organizations in the education and healthcare sectors. "Thousands of businesses have dramatically improved their competitiveness and effectiveness by participating in the Baldrige Award program. Knowing that the country's educational and healthcare organizations will now have the potential to reap similar benefits from the Baldrige program is good news for all Americans," said Roger Ackerman, chairman and CEO of Corning Incorporated and president of the foundation.

The foundation-raised endowment will help fund activities such as printing and distributing criteria and training private-sector examiners who review applications. In 1988, the foundation raised $10.4 million to endow the Baldrige Award for business.

The new Baldrige Award programs will help education and healthcare organizations improve performance, share best practices, and foster partnerships involving schools, businesses, healthcare organizations, human services agencies and others, said Harry Hertz, director of the Baldrige National Quality Program at NIST.

"Increasingly, the costs of healthcare and the need for improved education are affecting our country's economic development and competitiveness," said Hertz. "The performance excellence concepts embodied in the Baldrige Award criteria are a way to help meet these challenges," he said. The education and healthcare sectors have expressed strong interest in establishing Baldrige quality award programs for their communities. In 1995, NIST conducted a successful pilot award program. Forty-six healthcare and 19 education organizations submitted applications for the pilot. Until now, federal funding has not been available to establish award categories.

Education organizations and healthcare providers planning on applying for the 1999 Baldrige Award can use the 1998 performance excellence criteria. The criteria are available from the Baldrige National Quality Program, telephone: (301) 975-2036, or through the program's web site: http://www.quality.nist.gov.

More than 40 state quality award programs are based on the Baldrige Award program, and 35 of these recognize education and healthcare organizations. Recently, the state of New Jersey passed a bill enabling school systems to use the New Jersey Quality Achievement Award criteria (based on the Baldrige criteria) as a substitute for the existing state assessment criteria.

The Malcolm Baldrige National Quality Award was established by Congress in 1987 to enhance U.S. competitiveness by promoting quality awareness, recognizing quality achievements of U.S. companies and publicizing successful performance strategies. The award is not given for specific products or services. Since 1988, 32 Awards have been presented.

As a non-regulatory agency of the U.S. Department of Commerce's Technology Administration, NIST promotes economic growth by working with industry to develop and apply technology, measurements and standards through four partnerships: the Measurement and Standards Laboratories, the Advanced Technology Program, the Manufacturing Extension Partnership and the Baldrige National Quality Program.

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NEW CHEMISTRY LABORATORY IS FIRST STEP TOWARD 21ST CENTURY NIST

FOR IMMEDIATE RELEASE:
March 8, 1999

Contact: Michael E. Newman
(301) 975-3025

NIST 99-08

The Commerce Department's National Institute of Standards and Technology took its first step into the 21st century with today's dedication of the new Advanced Chemical Sciences Laboratory in Gaithersburg, Md. Participating in the ceremony were Commerce Secretary William Daley, Sen. Paul Sarbanes (D-Md.), Sen. Barbara Mikulski (D-Md.), Rep. Connie Morella (R-Md.) and Montgomery County Executive Doug Duncan.

The $75 million, 18,588-square-meter (200,000-square-foot) ACSL was built to house the research programs of NIST's Chemical Science and Technology Laboratory. Research by CSTL scientists long has benefited our nation's health and environment, as well as industrial productivity and international trade. The new state-of-the-art ACSL features advanced designs that will help NIST meet 21st century needs for accurate chemical measurements, standards and methods used for pharmaceutical manufacturing, medical diagnosis, pollution monitoring and clean up, nutritional analysis and other chemical industries/sciences.

Among the features of the ACSL are 162 laboratory modules that can be reconfigured to meet special needs, 131 office modules, precise temperature and humidity control, high-capacity ventilation systems, an uninterruptible power supply, a high-purity water system, five clean rooms, two cold rooms, five non-metallic labs and advanced data transmission wiring.

Designer/builder for the ACSL is The Austin Company of Cleveland, Ohio. Construction began in February 1996. Construction management has been provided by CRSS Constructors Inc. (a member of the Jacobs Engineering Group) of Arlington, Va.

The completion of the ACSL is the first major step in the effort to upgrade NIST facilities used to conduct a wide range of advanced measurement research. President Clinton's fiscal year 2000 budget request for NIST includes funding for the next major goal of the plan: construction of the Advanced Measurement Laboratory at the NIST Gaithersburg, Md., site.

The AML will allow NIST to provide U.S. industry and science with higher quality reference materials, improved measurements and standards, and more rapidly developed research advances. It will feature stringent controls on particulate matter, temperature, vibration and humidity that are unattainable in current NIST buildings. Such conditions are vital for housing the institute's most advanced metrology, physics, chemistry, electronics, engineering and materials science research, and will enable NIST to keep pace with rapid developments in semiconductors, industrial robots, computers, pharmaceuticals and emerging technologies requiring molecular and atomic-level precision.

As a non-regulatory agency of the U.S. Department of Commerce's Technology Administration, NIST promotes economic growth by working with industry to develop and apply technology, measurements and standards through four partnerships: the Measurement and Standards Laboratories, the Advanced Technology Program, the Manufacturing Extension Partnership and the Baldrige National Quality Program.

'NEW KIT HELPS SMALL BUSINESSES GET A JUMP ON Y2K BUG', SAYS COMMERCE SECRETARY DALEY

FOR IMMEDIATE RELEASE:
March 22, 1999

Contact: Janice Kosko
(301) 975-2767

G 99-26

Small Business Y2K Action Week, March 29 - April 2

Sponsored by the U.S. Small Business Administration, U.S. Department of Commerce, U.S. Department of Agriculture, and other agencies of the President's Council on Year 2000 Conversion. Visit www.sba.gov/y2k or call (800-U-ASK-SBA, 800-827-5722) for information on Action Week events.

With everything from a self-assessment checklist to upgraded software, a new "Y2K Jumpstart Kit" developed under a Commerce Department program now is available to help small businesses better deal with the year 2000 computer problem, Commerce Secretary William M. Daley announced today.

"For those businesses who have not yet paid attention to the year 2000 computer problem, it is not too late," said Daley. "The Y2K Jumpstart Kit is readily available, easy to use and contains the basics that a small business needs to start addressing this critical problem," he said.

The main component of the kit is software known as Conversion 2000: Y2K Self-Help Tool. Developed last year by the Manufacturing Extension Partnership, a program of the Commerce Department's National Institute of Standards and Technology, the software has been upgraded and now is available in both Microsoft Access™ and Excel™ versions.

While the software will not solve a year 2000 computer problem, it can help small manufacturers and other small businesses:

- conduct an inventory of equipment, including hardware, software and embedded systems;
- identify core business systems and rate their importance to the survival of the business;
- develop contingency plans; and
- plan and manage remediation projects.

The Y2K Jumpstart Kit also includes a quick start guide, a detailed user's guide for the software, and a self-assessment checklist to help a company determine whether its or its suppliers' computer systems and equipment may have Y2K problems.

The Y2K Jumpstart Kit can be downloaded for free from the MEP web site at y2khelp.nist.gov. The kit also is available from MEP centers (1-800-MEP-4MFG, 637-4634), Small Business Administration Offices or U.S. Department of Agriculture Cooperative Extension offices around the country.

NIST recently opened the Y2K Help Center for Small Business to provide technical support to users of Conversion 2000: Y2K Self-Help Tool. Open from 8 a.m. to 8 p.m. (Eastern Time) Monday through Friday, the center can be contacted at 1-800-Y2K-7557 (925-7557) or at y2khelp@nist.gov, or by visiting the help center's web site, y2khelp.nist.gov.

NIST MEP centers around the country also are offering a variety of Y2K workshops to help small manufacturers determine if they have a Y2K problem and develop remediation and contingency plans.

The year 2000 date problem, often called "Y2K" or the "millennium bug," refers to the failure of a computer program or system because the "00" year designation is misinterpreted or mistaken for "1900." The Stamford, Conn.-based GartnerGroup, a leading authority on information technology issues; the National Federation of Independent Business; and other organizations have reported that many small businesses have not yet taken steps to address year 2000 problems. Many that are addressing problems with their computer systems may be overlooking potential problems embedded in other systems such as machine controllers and building control systems.

NIST's MEP is a nationwide network of manufacturing extension centers providing a wide array of business and technical assistance to smaller manufacturers in all 50 states, the District of Columbia and Puerto Rico. Through MEP, manufacturers have access to more than 2,000 manufacturing and business advisers whose job is to help firms make changes that lead to greater productivity, increased profits and enhanced global competitiveness.

NIST, an agency of the Commerce Department's Technology Administration, promotes economic growth by working with industry to develop and apply technology, measurements and standards through four partnerships: the Measurement and Standards Laboratories, the Advanced Technology Program, the Manufacturing Extension Partnership and the Baldrige National Quality Program.

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other dates? handouts

NIST Advanced Measurement Laboratory

June 9, 2000

Media Contact:
Michael E. Newman
(301) 975-3025

G 2000-100

- Ground Broken for World's Premier Measurement Research Facility (News Release)
- Advanced Measurement Laboratory brochure
- Advanced Measurement Laboratory Web site
- Advanced Measurement Laboratory photos/artist renditions
- Photos from Advanced Measurement Laboratory groundbreaking, June 9, 2000
- Remarks by Commerce Secretary Daley at the Advanced Measurement Laboratory groundbreaking
- Research Project of the Type that Would Benefit from Being Conducted in the Advanced Measurement Laboratory
- NIST Measurement and Standards Laboratories
- NIST Seeks Diverse Team for Constructing State-of-the-Art Laboratory (News Release)

Ground Broken for World's Premier Measurement Research Facility

Perhaps one of the most significant milestones in the nearly 100-year history of the National Institute of Standards and Technology occurred today when ground was broken in Gaithersburg, Md., on the NIST Advanced Measurement Laboratory.

When it is ready for occupancy in 2004, the 47,480-square-meter (511,070-square-foot), $235.2 million AML will give NIST—an agency of the Commerce Department's Technology Administration—and its partners in U.S. industry access to research and development capabilities not available anywhere else in the world. The laboratory's unique characteristics will help industry/government collaborators achieve higher quality reference materials, improved measurements and standards, and more rapidly developed research advances.

Participating in today's groundbreaking ceremony were Commerce Secretary William Daley, Senator Paul Sarbanes (D-Md.), Senator Barbara Mikulski (D-Md.), Congresswoman Constance Morella (R-Md.), Montgomery County Executive Doug Duncan and Under Secretary of Commerce for Technology Cheryl Shavers.

"The AML is the world-class facility that will provide the United States with global leadership in measurements and standards, and set the foundation for

technological advances well into the 21st century," said Secretary Daley. "What will come from within these walls will enhance U.S. industrial competitiveness, foster economic growth and improve the quality of life for all Americans."

The AML will feature stringent controls on particulate matter, temperature, vibration and humidity that are unattainable in current NIST buildings. Such conditions are vital for housing the institute's most advanced metrology, physics, chemistry, electronics, engineering, manufacturing and materials science research, and will enable NIST to keep pace with rapid developments in semiconductors, industrial robots, computers, pharmaceuticals and emerging technologies requiring molecular and atomic-level precision.

The AML will consist of five sections: two single-floor measurement laboratory sections below ground with 151 modules (for improved vibration isolation and temperature control), two single-floor instrument laboratory sections above ground with 187 modules and one ultraclean room wing above ground. Specialty areas within the AML include 48 precision temperature control laboratories (constant temperatures within ±0.1 degree Celsius or ±0.01 degree Celsius depending on need) and 27 extremely low-vibration laboratories.

Characteristics that will be uniform throughout the AML include HEPA filtration for all laboratory air; a baseline temperature control of ±0.25 degree Celsius; mechanical, electrical, and structural systems designed to minimize vibration; and a power system rated for critical electronic loads. Mechanical services (piping, ventilation and electrical) as well as laboratory support equipment (such as gas canisters) are located in a service corridor located between laboratory modules, maximizing flexibility and cleanliness.

Finally, natural daylighting, energy conservation and recycling are incorporated into the "green" building design and planned operation of the AML.

As a non-regulatory agency of the U.S. Department of Commerce's Technology Administration, NIST strengthens the U.S. economy and improves the quality of life by working with industry to develop and apply technology, measurements and standards through four partnerships: the Measurement and Standards Laboratories, the Advanced Technology Program, the Manufacturing Extension Partnership and the Baldrige National Quality Program.

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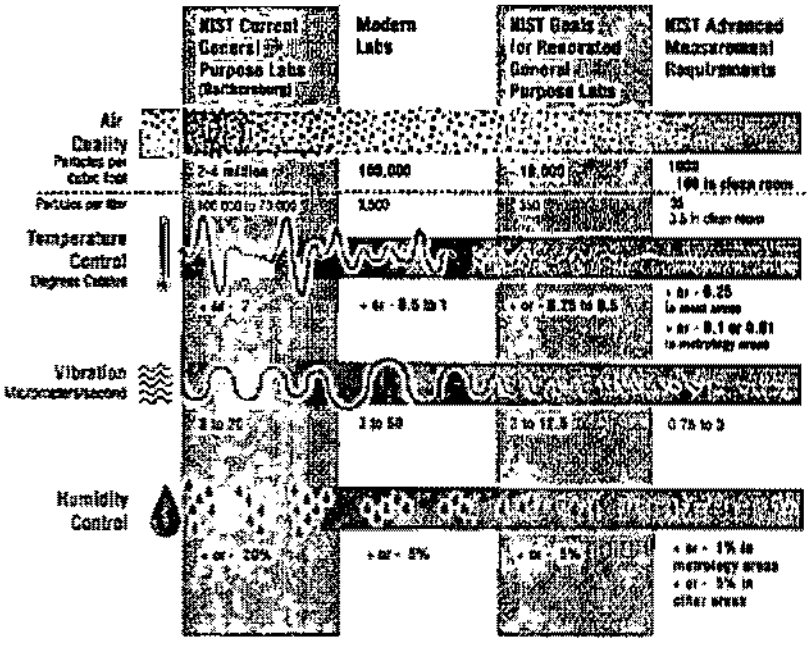
NIST Advanced Measurement Laboratory

Building on Success

For almost 100 years, the National Institute of Standards and Technology has developed the measurements and standards necessary for the United States to excel in technology innovation. For example, the telecommunications industry relies on NIST standards for the speed and efficiency of calls relayed on optical fiber. U.S. auto makers and parts manufacturers rely on NIST calibrations, standards, and technology to ensure the quality and reliability of their products. Semiconductor chip makers need an array of NIST measurements to produce ever smaller and faster electronics.

To continue to respond to U.S. science and industry's needs for more sophisticated measurements and standards in the face of heightened global competition, NIST is beginning construction of what will be one of the most technologically advanced buildings in the world—the Advanced Measurement Laboratory, or AML.

In the nearly 40 years since the NIST Gaithersburg, Md., campus was constructed, industry demand for highly accurate measurement standards has grown tremendously. Global economic competition, increasingly advanced communications, and ever more sophisticated technology are driving some of these needs. To meet the demands, researchers at NIST, part of the Commerce Department's Technology Administration, have developed new ways to more accurately measure, quantify, and calibrate industrially important processes and properties.



Technical obsolescence of NIST's current laboratories
Base building criteria

Technology for Tomorrow

NIST scientists and engineers can locate and manipulate single atoms on a surface; detect ultratrace amounts of chemical agents; and measure the many optical, physical, and quantum properties of components for telecommunications devices, semiconductor chips, and magnetic recording devices. However, deteriorating conditions in NIST's older lab facilities currently are limiting the quality, accuracy, and productivity of many of these efforts. When the AML is ready for use by Gaithersburg researchers in 2004, it will dramatically improve NIST's ability to provide U.S. industry and science with the best measurements and standards in the world.

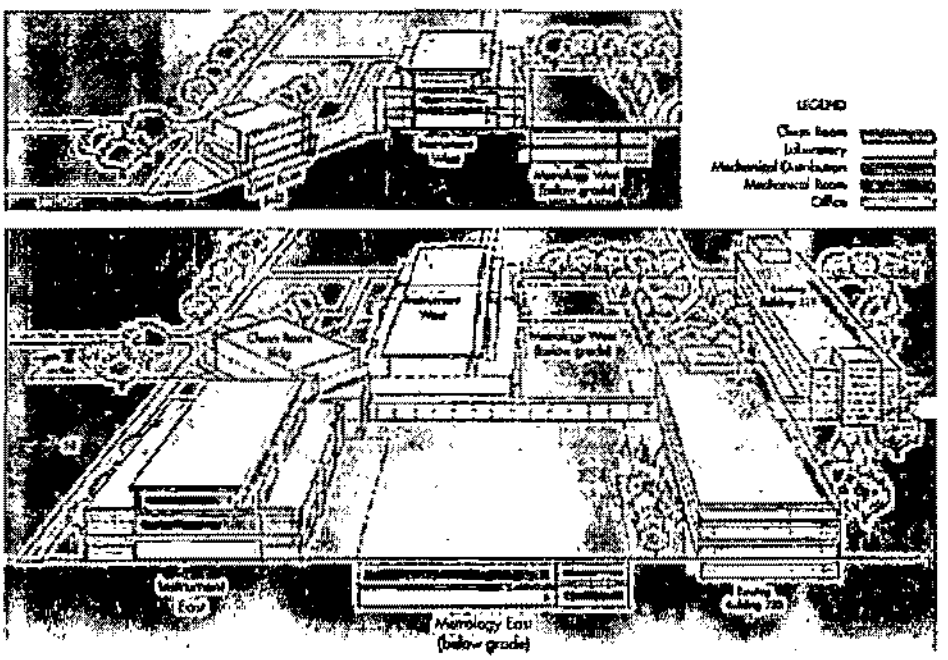
The AML will provide superior vibration, temperature and humidity control, and air cleanliness. Compared to the existing NIST laboratory buildings, most of which were built in the 1960s, the AML will dramatically reduce vibration to sensitive experiments measuring atomic distances of just a few nanometers (billionths of a meter). Like vibration, temperature fluctuations can disturb the results of very sensitive measurements. Standard AML laboratories will provide temperature control of ± 0.25 degree Celsius with specialized labs providing ± 0.10 degree Celsius and ± 0.01 degree Celsius temperature control to meet the stringent scientific requirements. Air inside the building will be HEPA filtered to provide very good air cleanliness so dust or other stray particles will not foul measurements on atomic-scale devices. A special Class 100 clean room wing will provide air cleanliness needed for more sensitive research.

Humidity control will provide variations of no more than 1 percent in specialized areas and 5 percent throughout the rest of the facility. Certain instruments, measurements, and chemical reactions are extremely sensitive to humidity. The AML also will provide labs with improved electrical power quality. In existing NIST labs, spikes and dips in the voltage and current can affect sensitive measurements adversely. Economic evaluations have concluded that the best way to provide needed air cleanliness, vibration, isolation, electrical power quality, and temperature and humidity control is to

build the AML. Retrofitting the existing buildings to AML-quality environmental conditions is not economically feasible.

To achieve the required conditions, the AML will consist of five wings, each with one level housing laboratory space and one or two levels for mechanical equipment and environmental controls. Two of the five sections will be completely below ground for improved vibration isolation and temperature control. They will be unaffected by outside temperature variation and vibration induced by the wind. Special isolated concrete slabs also will reduce vibration levels. The area immediately above these two sections will be designated quiet zones and planted with minimal care landscaping.

Once occupied, the AML will house a wide variety of laboratory research from NIST's technical units. The most sensitive experiments deemed to have the greatest need for special environmental controls and the highest impact will be selected to relocate to the AML. The following are current examples of research that could be done more efficiently and with greater accuracy if conducted in the AML.



Schematic of AML

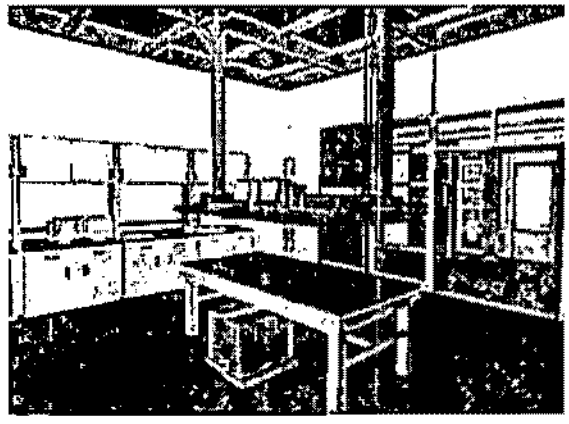
Why the Air Must Be Very Clean

A specially designed laboratory within the AML would allow development of NIST Standard Reference Materials for measuring wafer contamination for semiconductor manufacturers. To do this work, scientists need to isolate a field emission analytical electron microscope from dust particles, vibration, magnetic fields, and temperature change. The microscope must focus on nanometer-scale regions of a semiconductor wafer for an extended period of time. In its current location, the microscope will drift away from the area of study in just seconds. Furthermore, poor air quality in the existing lab would ruin any industrial semiconductor samples brought into it. This is because the structures in modern computer chips are so small that a single

nanometer-scale contamination particle can cause the whole device to fail. Standard Reference Materials to help semiconductor manufacturers accurately measure contamination of their products ultimately would improve efficiency and quality control for the manufacturers.

When Humidity Hurts

Using precisely tuned lasers to capture and manipulate atoms, NIST researchers have produced some of the coldest matter ever, creating atom clouds with temperatures of less than a millionth of a degree above absolute zero. In addition to winning a Nobel prize for its contribution to understanding the quantum nature of matter, this work is yielding important contributions to the next generation of time and frequency standards, which are essential to communications and navigation. However, present lab conditions slow and complicate this work. Uncontrollable humidity fluctuations degrade the stability and performance of the precision lasers used to focus, trap, and manipulate the tiny clouds of cold atoms. Large vibrations and poor air quality cause further problems, impeding the rate of progress of the research. In the AML, these problems essentially would be eliminated.



Typical laboratory in the instrument wings.

When Vibrations Aren't Good

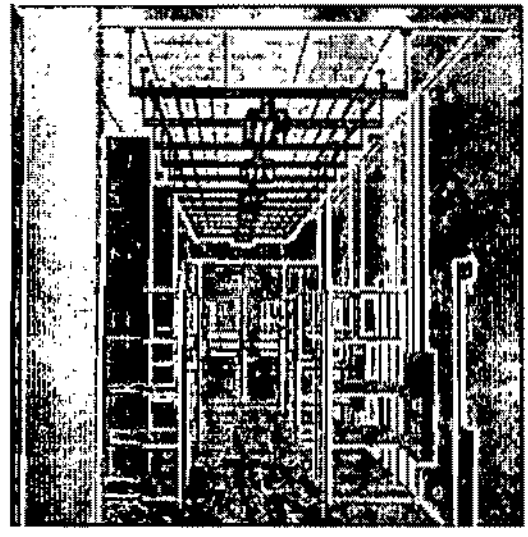
NIST researchers are using ultra-fast laser pulses to probe chemical reactions at surfaces of metals, silicon, and other advanced materials. These studies could lead to more efficient ways to catalyze chemical reactions for more efficient chemical production or build nanoscale structures for faster, more powerful electronic components. Temperature and humidity changes, electric current stability, air particles, and vibration can force researchers to scrap their results and start over. The experiments are conducted with very fast laser pulses measured in femtoseconds (quadrillionths of a second). Since light travels 0.3 millionths of a meter in one femtosecond, the 1.5 meter by 3 meter table holding the laser and related optics must vibrate no more than 0.3 millionths of a meter. In its current location, the femtosecond laser equipment is stable for no more than one hour. Sections of the AML with the least vibration will meet the environmental requirements for these kinds of experiments.

Changing Temperature Hampers Accuracy

Challenged to produce parts with ever more complex features within ever

finer tolerances, manufacturers use coordinate measuring machines (CMMs) to inspect the dimensions of manufactured gears and other machine parts. About 30,000 CMMs are employed in US factories and laboratories. NIST provides industry with several measurement tools and services to ensure the accuracy of CMM measurements. NIST efforts to improve the accuracy of CMM measurements have been plagued with problems due to poor air quality, humidity, and vibration. CMMs are particularly sensitive to temperature. Calibrating the artifacts that industry uses to check the accuracy of its own CMMs requires a very stable temperature for the duration of a series of complex measurements to achieve the desired accuracy. Even heat from a person standing near the CMM will cause the metal to expand slightly, enough to alter the accuracy of a CMM calibration. The AML would provide 10 times better temperature control as well as improved air quality and vibration and humidity control.

AML Specifications



Mechanical services as well as "dirty" laboratory support equipment and gas bottles will be located in service galleys between laboratory modules, maximizing flexibility and cleanliness.

- 47,480 square meters, or 511,070 square feet total
- Cost: $235.2 million
- Occupancy expected in FY 2004
- 2 single-floor metrology laboratory sections completely below grade with 151 lab modules n 2 single-floor instrument laboratory sections above ground with 187 lab modules
- 1 above ground Class 100 clean room wing (3.5 or fewer particles per liter), upgradable to Class 10
- Baseline temperature control to within ±0.25 degree Celsius
- Temperature control to within ±0.1 or ±0.01 degree Celsius for 48 precision temperature control laboratories in metrology sections
- Several types of vibration isolation foundations in metrology laboratory sections for a velocity amplitude of 3 micrometers per second or less
- Humidity control to within 1 percent in special metrology laboratory sections and 5 percent in the rest of the facility
- Building-wide conditioned power supply system that will meet IEEE Std. 1100-1992 for critical electronic loads
- Ceiling heights in laboratory modules adaptable to 7 meters (22 feet)
- Natural daylighting, energy conservation, and recycling incorporated into the AML's design and planned operation

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Created: June 7, 2000
Last updated: June 13, 2000

Commerce Department Announces Winner of Global Information Security Competition

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Commerce Department Announces Winner of Global Information Security Competition

FOR IMMEDIATE RELEASE:
Oct. 2, 2000

Contact: Philip Bulman
(301) 975-5661

G 2000-176

A worldwide competition to develop a new encryption technique that can be used to protect computerized information ended today when Secretary of Commerce Norman Y. Mineta announced the nation's proposed new Advanced Encryption Standard.

Mineta named the Rijndael (pronounced Rhine-doll) data encryption formula as the winner of a three-year competition involving some of the world's leading cryptographers.

"Once final, this standard will serve as a critical computer security tool supporting the rapid growth of electronic commerce," Mineta said. "This is a very significant step toward creating a more secure digital economy. It will allow e-commerce and e-government to flourish safely, creating new opportunities for all Americans," he said.

Computer scientists at the National Institute of Standards and Technology, an agency of the Commerce Department's Technology Administration, organized the international competition in a drive to develop a strong information encryption formula to protect sensitive information in federal computer systems. Many businesses are expected to use the AES as well.

The proposed selection of Rijndael as the AES will be formally announced in the Federal Register in several months, and NIST then will receive public comments on the draft Federal Information Processing Standard for 90 days.

Researchers from 12 different countries worked on developing advanced encoding methods during the global competition.

NIST invited the worldwide cryptographic community to "attack" the encryption formulas in an effort to break the codes.

After narrowing the field down from 15 formulas to five, NIST invited cryptographers to intensify their attacks on the finalists. The agency and the world cryptographic community also evaluated the encoding formulas for factors such as security, speed and versatility.

The Rijndael developers are Belgian cryptographers Joan Daemen (pronounced Yo'-ahn Dah'-mun) of Proton World International and Vincent Rijmen (pronounced Rye'-mun) of Katholieke Universiteit Leuven. Both are highly regarded experts within the international cryptographic community.

NIST organized and managed the competition with considerable private-sector cooperation.

The competing AES candidates were sophisticated mathematical formulas called algorithms. Algorithms are at the heart of computerized encryption systems, which encode everything from electronic mail to the secret personal identification numbers, or PINs, that people use with bank teller machines.

When approved, the AES will be a public algorithm designed to protect sensitive government information well into the 21st century. It will replace the aging Data Encryption Standard, which NIST adopted in 1977 as a Federal Information Processing Standard used by federal agencies to protect sensitive, unclassified information.

DES and a variant called Triple DES are used widely in the private sector as well, especially in the financial services industry.

The effort to establish the AES reflects the dramatic transformation that cryptography has undergone in recent years.

Just a few decades ago the science of cryptography was an esoteric endeavor employed primarily by governments to protect state and military secrets. Today, millions of Americans use cryptography, often without knowing it. Most people who use automated teller machines have used cryptography because the secret PINs required by the machines are encrypted before being sent to a computer that makes sure the number matches the card.

Others use information encryption when they make a purchase over the Internet. Their credit card numbers are encrypted when they place an order.

Hundreds of encryption products currently employ DES or Triple DES, and such systems have become almost ubiquitous in the financial services industry. Consequently, the selection of the AES may affect millions of consumers and businesses.

NIST requested proposals for the AES on Sept. 12, 1997, and a variety of organizations around the world responded with enthusiasm. Each of the candidate algorithms was required to support key sizes of 128, 192 and 256 bits. For a 128-bit key size, there are approximately 340,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000 (340 followed by 36 zeros) possible keys.

NIST evaluated the candidate algorithms and received invaluable assistance from cryptographers at computer security companies and universities around the world. Good security was the primary quality required of the winning formula, but factors such as speed and versatility across a variety of computer platforms also were considered. In other words, the algorithms must be able to run securely and efficiently on large

computers, desktop computers and even small devices such as smart cards.

NIST and leading cryptographers from around the world found that all five finalist algorithms had a very high degree of security. Rijndael was selected because it had the best combination of security, performance, efficiency, implementability and flexibility.

The AES competition was organized by computer scientists in NIST's Information Technology Laboratory. A lengthy technical analysis of the AES candidates is being posted on NIST's web site today at www.nist.gov/aes.

After the public comment period, NIST will revise the proposed standard—if appropriate—and submit it to the Secretary of Commerce for adoption as an official federal standard. This process is expected to be complete by the spring of 2001.

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As a non-regulatory agency of the U.S. Department of Commerce's Technology Administration, NIST strengthens the U.S. economy and improves the quality of life by working with industry to develop and apply technology, measurements and standards through four partnerships: the Measurement and Standards Laboratories, the Advanced Technology Program, the Manufacturing Extension Partnership and the Baldrige National Quality Program.

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For more information about NIST, see our web site at www.ta.nist.gov.

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The National Information Infrastructure:

Agenda for Action

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THE NATIONAL INFORMATION INFRASTRUCTURE: AGENDA FOR ACTION

EXECUTIVE SUMMARY

All Americans have a stake in the construction of an advanced National Information Infrastructure (NII), a seamless web of communications networks, computers, databases, and consumer electronics that will put vast amounts of information at users' fingertips. Development of the NII can help unleash an information revolution that will change forever the way people live, work, and interact with each other:

- People could live almost anywhere they wanted, without foregoing opportunities for useful and fulfilling employment, by "telecommuting" to their offices through an electronic highway;
- The best schools, teachers, and courses would be available to all students, without regard to geography, distance, resources, or disability;
- Services that improve America's health care system and respond to other important social needs could be available on-line, without waiting in line, when and where you needed them.

Private sector firms are already developing and deploying that infrastructure today. Nevertheless, there remain essential roles for government in this process. Carefully crafted government action will complement and enhance the efforts of the private sector and assure the growth of an information infrastructure available to all Americans at reasonable cost. In developing our policy initiatives in this area, the Administration will work in close partnership with business, labor, academia, the public, Congress, and state and local government. Our efforts will be guided by the following principles and objectives:

- Promote private sector investment, through appropriate tax and regulatory policies.
- Extend the "universal service" concept to ensure that information resources are available to all at affordable prices. Because information means empowerment--and employment--the government has a duty to ensure that all Americans have access to the resources and job creation potential of the Information Age.
- Act as a catalyst to promote technological innovation and new applications. Commit important government research programs and grants to help the private sector develop and demonstrate technologies needed for the NII, and develop the applications and services that will maximize its value to users.
- Promote seamless, interactive, user-driven operation of the NII. As the NII evolves into a "network of networks," government will ensure that users can transfer information across networks easily and efficiently. To increase the likelihood that the NII will be both interactive and, to a large extent, user- driven, government must reform regulations and policies that may inadvertently hamper the development of interactive applications.
- Ensure information security and network reliability. The NII must be trust-worthy and secure, protecting the privacy of its users. Government action will also ensure that the overall system remains reliable, quickly repairable in the event of a failure and, perhaps most importantly, easy to use.
- Improve management of the radio frequency spectrum, an increasingly critical resource.
- Protect intellectual property rights. The Administration will investigate how to strengthen domestic copyright laws and international intellectual property treaties to prevent piracy and to

protect the integrity of intellectual property.

- Coordinate with other levels of government and with other nations. Because information crosses state, regional, and national boundaries, coordination is critical to avoid needless obstacles and prevent unfair policies that handicap U.S. industry.

- Provide access to government information and improve government procurement. The Administration will seek to ensure that Federal agencies, in concert with state and local governments, use the NII to expand the information available to the public, ensuring that the immense reservoir of government information is available to the public easily and equitably. Additionally, Federal procurement policies for telecommunications and information services and equipment will be designed to promote important technical developments for the NII and to provide attractive incentives for the private sector to contribute to NII development.

The time for action is now. Every day brings news of change: new technologies, like hand-held computerized assistants; new ventures and mergers combining businesses that not long ago seemed discrete and insular; new legal decisions that challenge the separation of computer, cable, and telephone companies. These changes promise substantial benefits for the American people, but only if government understands fully their implications and begins working with the private sector and other interested parties to shape the evolution of the communications infrastructure.

The benefits of the NII for the nation are immense. An advanced information infrastructure will enable U.S. firms to compete and win in the global economy, generating good jobs for the American people and economic growth for the nation. As importantly, the NII can transform the lives of the American people -- ameliorating the constraints of geography, disability, and economic status -- giving all Americans a fair opportunity to go as far as their talents and ambitions will take them.


Agenda for Action

The Administration's Agenda for Action

Version 1.0

I. The Promise of the NII

Imagine you had a device that combined a telephone, a TV, a camcorder, and a personal computer. No matter where you went or what time it was, your child could see you and talk to you, you could watch a replay of your team's last game, you could browse the latest additions to the library, or you could find the best prices in town on groceries, furniture, clothes -- whatever you needed.

Imagine further the dramatic changes in your life if:

- The best schools, teachers, and courses were available to all students, without regard to geography, distance, resources, or disability;
- The vast resources of art, literature, and science were available everywhere, not just in large institutions or big-city libraries and museums;
- Services that improve America's health care system and respond to other important social needs were available on-line, without waiting in line, when and where you needed them;
- You could live in many places without foregoing opportunities for useful and fulfilling employment, by "telecommuting" to your office through an electronic highway instead of by automobile, bus or train;
- Small manufacturers could get orders from all over the world electronically -- with detailed specifications -- in a form that the machines could use to produce the necessary items;
- You could see the latest movies, play the hottest video games, or bank and shop from the comfort of your home whenever you chose;
- You could obtain government information directly or through local organizations like libraries, apply for and receive government benefits electronically, and get in touch with government officials easily; and
- Individual government agencies, businesses and other entities all could exchange information electronically -- reducing paperwork and improving service.

Information is one of the nation's most critical economic resources, for service industries as well as manufacturing, for economic as well as national security. By one estimate, two- thirds of U.S. workers are in information-related jobs, and the rest are in industries that rely heavily on information. In an era of global markets and global competition, the technologies to create, manipulate, manage and use information are of strategic importance for the United States. Those technologies will help U.S. businesses remain competitive and create challenging, high- paying jobs. They also will fuel economic growth which, in turn, will generate a steadily-increasing standard of living for all Americans.

That is why the Administration has launched the National Information Infrastructure initiative. We are committed to working with business, labor, academia, public interest groups, Congress, and state and local government to ensure the development of a national information infrastructure (NII) that enables all Americans to access information and communicate with each other using voice, data, image or video at anytime, anywhere. By encouraging private sector investment in the NII's development, and through government programs to improve access to essential services, we will promote U.S. competitiveness, job creation and solutions to pressing social problems.

II. What Is the NII?

The phrase "information infrastructure" has an expansive meaning. The NII includes more than just the physical facilities used to transmit, store, process, and display voice, data, and images. It encompasses:

- A wide range and ever-expanding range of equipment including cameras, scanners, keyboards, telephones, fax machines, computers, switches, compact disks, video and audio tape, cable, wire, satellites, optical fiber transmission lines, microwave nets, switches, televisions, monitors, printers, and much more.

  The NII will integrate and interconnect these physical components in a technologically neutral manner so that no one industry will be favored over any other. Most importantly, the NII requires building foundations for living in the Information Age and for making these technological advances useful to the public, business, libraries, and other nongovernmental entities. That is why, beyond the physical components of the infrastructure, the value of the National Information Infrastructure to users and the nation will depend in large part on the quality of its other elements:

- The information itself, which may be in the form of video programming, scientific or business databases, images, sound recordings, library archives, and other media. Vast quantities of that information exist today in government agencies and even more valuable information is produced every day in our laboratories, studios, publishing houses, and elsewhere.

- Applications and software that allow users to access, manipulate, organize, and digest the proliferating mass of information that the NII's facilities will put at their fingertips.

- The network standards and transmission codes that facilitate interconnection and interoperation between networks, and ensure the privacy of persons and the security of the information carried, as well as the security and reliability of the networks .

- The people -- largely in the private sector -- who create the information, develop applications and services, construct the facilities, and train others to tap its potential. Many of these people will be vendors, operators, and service providers working for private industry.

Every component of the information infrastructure must be developed and integrated if America is to capture the promise of the Information Age.

The Administration's NII initiative will promote and support full development of each component. Regulatory and economic policies will be adopted that encourage private firms to create jobs and invest in the applications and physical facilities that comprise the infrastructure. The Federal government will assist industry, labor, academia, and state and local governments in developing the information resources and applications needed to maximize the potential of those underlying facilities. Moreover, and perhaps most importantly, the NII initiative will help educate and train our people so that they are prepared not only to contribute to the further growth of the NII, but also to understand and enjoy fully the services and capabilities that it will make available.

III. Need for Government Action To Complement Private Sector Leadership

The foregoing discussion of the transforming potential of the NII should not obscure a fundamental fact -- the private sector is already developing and deploying such an infrastructure today. The United States communications system -- the conduit through which most information is accessed or distributed -- is second to none in speed, capacity, and reliability. Each year the information resources, both hardware and software, available to most Americans are substantially more extensive and more powerful than the previous year.

The private sector will lead the deployment of the NII. In recent years, U.S. companies have invested more than $50 billion annually in telecommunications infrastructure -- and that figure does not account for the vast investments made by firms in related industries, such as computers. In contrast, the Administration's ambitious agenda for investment in critical NII projects (including computing) amounts

to $1-2 billion annually. Nonetheless, while the private sector role in NII development will predominate, the government has an essential role to play. In particular, carefully crafted government action can complement and enhance the benefits of these private sector initiatives. Accordingly, the Administration's NII initiative will be guided by the following nine principles and goals, which are discussed in more detail below:

- 1) Promote private sector investment, through tax and regulatory policies that encourage innovation and promote long- term investment, as well as wise procurement of services.
- 2) Extend the "universal service" concept to ensure that information resources are available to all at affordable prices. Because information means empowerment, the government has a duty to ensure that all Americans have access to the resources of the Information Age.
- 3) Act as catalyst to promote technological innovation and new applications. Commit important government research programs and grants to help the private sector develop and demonstrate technologies needed for the NII.
- 4) Promote seamless, interactive, user-driven operation of the NII. As the NII evolves into a "network of networks," government will ensure that users can transfer information across networks easily and efficiently.
- 5) Ensure information security and network reliability. The NII must be trustworthy and secure, protecting the privacy of its users. Government action will also aim to ensure that the overall system remains reliable, quickly repairable in the event of a failure and, perhaps most importantly, easy to use.
- 6) Improve management of the radio frequency spectrum, an increasingly critical resource.
- 7) Protect intellectual property rights. The Administration will investigate how to strengthen domestic copyright laws and international intellectual property treaties to prevent piracy and to protect the integrity of intellectual property.
- 8) Coordinate with other levels of government and with other nations. Because information crosses state, regional, and national boundaries, coordination is important to avoid unnecessary obstacles and to prevent unfair policies that handicap U.S. industry.
- 9) Provide access to government information and improve government procurement. As described in the National Performance Review, the Administration will seek to ensure that Federal agencies, in concert with state and local governments, use the NII to expand the information available to the public, so that the immense reservoir of government information is available to the public easily and equitably. Additionally, Federal procurement policies for telecommunications and information services and equipment will be designed to promote important technical developments for the NII and to provide attractive incentives for the private sector to contribute to NII development.
- The time for action is now. Every day brings news of change: new technologies, like hand-held computerized assistants; new ventures and mergers combining businesses that not long ago seemed discrete and insular; new legal decisions that challenge the separation of computer, cable and telephones. These changes promise substantial benefits for the American people, but only if government understands fully the implications of these changes and to work with the private sector and other interested parties to shape the evolution of the communications infrastructure.

IV. **Managing Change/ Forging Partnerships**

We will help to build a partnership of business, labor, academia, the public, and government that is committed to deployment of an advanced, rapid, powerful infrastructure accessible and accountable to all Americans.

Forging this partnership will require extensive inter- governmental coordination to ensure that Administration, Congressional, state and local government policy regarding the NII is consistent, coherent, and timely. It also requires the development of strong working alliances among industry groups and between government and the businesses responsible for creating and operating the NII. Finally, close cooperation will be needed between government, users, service providers, and public interest groups to ensure that the NII develops in a way that benefits the American people.

Specifically, the Administration will:

- (1) Establish an interagency Information Infrastructure Task Force

  The President has convened a Federal inter-agency "Information Infrastructure Task Force" (IITF) that will work with Congress and the private sector to propose the policies and initiatives needed to accelerate deployment of a National Information Infrastructure. Activities of the IITF include coordinating government efforts in NII applications, linking government applications to the private sector, resolving outstanding disputes, and implementing Administration policies. Chaired by Secretary of Commerce Ron Brown and composed of high- level Federal agency representatives, the IITF's three committees focus on telecommunications policy, information policy, and applications.

- (2) Establish a private sector Advisory Council on the National Information Infrastructure

  To facilitate meaningful private sector participation in the IITF's deliberations, the President will sign an Executive Order creating the "United States Advisory Council on the National Information Infrastructure" to advise the IITF on matters relating to the development of the NII. The Council will consist of 25 members, who will be named by the Secretary of Commerce by December 1993. Nominations will be solicited from a variety of NII constituencies and interested parties. The IITF and its committees also will use other mechanisms to solicit public comment to ensure that it hears the views of all interested parties.

- (3) Strengthen and streamline Federal communications and information policy-making agencies

  In order to implement the ambitious agenda outlined in this document, the federal agencies most directly responsible for the evolution of the NII (such as NTIA, the Office of Information and Regulatory Affairs at OMB, and the FCC) must be properly structured and adequately staffed to address many new and difficult policy issues. The Administration intends to ensure that these agencies have the intellectual and material resources they need. In addition, in accord with the Vice President's National Performance Review, these agencies will make the organizational and procedural changes needed to most effectively contribute to the NII initiative.

V. **Principles and Goals for Government Action**

The Task Force currently is undertaking a wide-ranging examination of all issues relevant to the timely development and growth of the National Information Infrastructure. Specific principles and goals in areas where government action is warranted have already been identified and work has begun on the following matters:

- 1. Promote Private Sector Investment

  One of the most effective ways to promote investments in our nation's information infrastructure is to introduce or further expand competition in communications and information markets. Vibrant competition in these markets will spur economic growth, create new businesses and benefit U.S. consumers.

  To realize this vision, however, policy changes will be necessary:

  Action: Passage of communications reform legislation. The Administration will work with

Congress to pass legislation by the end of 1994 that will increase competition and ensure universal access in communications markets -- particularly those, such as the cable television and local telephone markets, that have been dominated by monopolies. Such legislation will explicitly promote private sector infrastructure investment -- both by companies already in the market and those seeking entry.

Action: Revision of tax policies. Tax policies are important determinants of the amount of private sector investment in the NII. The President has signed into law tax incentives for private sector investment in R&D and new business formation, including a three-year extension of the R&D credit and a targeted capital gains reduction for investments in small businesses. Both of these tax incentives will help spur the private sector investment needed to develop the NII.

- 2. Extend the "Universal Service" Concept to Ensure that Information Resources Are Available to All at Affordable Prices

The Communications Act of 1934 articulated in general terms a national goal of "Universal Service" for telephones -- widespread availability of a basic communications service at affordable rates. A major objective in developing the NII will be to extend the Universal Service concept to the information needs of the American people in the 21st Century. As a matter of fundamental fairness, this nation cannot accept a division of our people among telecommunications or information "haves" and "have- nots." The Administration is committed to developing a broad, modern concept of Universal Service -- one that would emphasize giving all Americans who desire it easy, affordable access to advanced communications and information services, regardless of income, disability, or location.

Devising and attaining a new goal for expanded Universal Service is consistent with efforts to spur infrastructure development by increasing competition in communications and information markets. As noted above, competition can make low cost, high quality services and equipment widely available. Policies promoting greater competition in combination with targeted support for disadvantaged users or especially high cost or rural areas would advance both rapid infrastructure modernization and expanded Universal Service.

> **Action:** Develop a New Concept of Universal Service. To gather information on the best characteristics of an expanded concept of Universal Service, the Commerce Department's National Telecommunications and Information Administration (NTIA) will hold a series of public hearings on Universal Service and the NII, beginning by December 1993. The Administration will make a special effort to hear from public interest groups. Building on the knowledge gained from these activities, the IITF will work with the Advisory Council on the National Information Infrastructure, as well as with state regulatory commissions, to determine how the Universal Service concept should be applied in the 21st Century.

- 3. Promote Technological Innovation and New Applications

Government regulatory, antitrust, tax, and intellectual property policies all affect the level and timing of new offerings in services and equipment -- including the technology base that generates innovations for the marketplace. But technological innovations ultimately depend upon purposeful investment in research and development, by both the private sector and government. R&D investment helps firms to create better products and services at lower costs.

As noted in the Administration's February 22, 1993 technology policy statement: "We are moving to accelerate the development of technologies critical for long-term growth but not receiving adequate support from private firms, either because the returns are too distant or because the level of funding required is too great for individual firms to bear." Government research support already has helped create basic information technologies in computing, networking and electronics. We will support further NII-related research and technology development through research partnerships and other mechanisms to accelerate technologies where market mechanisms do not

adequately reflect the nation's return on investment. In particular, these government research and funding programs will focus on the development of beneficial public applications in the fields of education, health care, manufacturing, and provision of government services.

Action: Continue the High-Performance Computing and Communications Program. Established by the High-Performance Computing Act of 1991, the HPCC Program funds R&D designed to create more powerful computers, faster computer networks, and more sophisticated software. In addition, the HPCC Program is providing scientists and engineers with the tools and training they need to solve "Grand Challenges," research problems -- like designing new drugs -- that cannot be solved without the most powerful computers. The Administration has requested $1 billion for the HPCC Program in fiscal year 1994, and is in the process of forming a "High-Performance Computing Advisory Committee," to provide private sector input on the Program.

We have also requested an additional $96 million in the FY 1994 budget to create a new component of the HPCC Program -- Information Infrastructure Technologies and Applications (IITA). The Administration is working with Congress to obtain authorization to fund this effort, which will develop and apply high-performance computing and high-speed networking technologies for use in the fields of health care, education, libraries, manufacturing, and provision of government information.

Action: Implement the NII Pilot Projects Program. In its FY 94 budget, the Administration has requested funding from the Congress for NII networking pilot and demonstration projects. Under NTIA's direction, this pilot program will provide matching grants to state and local governments, health care providers, school districts, libraries, universities, and other non-profit entities. The grants will be awarded after a competitive merit review process and will be used to fund projects to connect institutions to existing networks, enhance communications networks that are currently operational, and permit users to interconnect among different networks. Funded projects will demonstrate the potential of the NII and provide tangible benefits to their communities. Equally important, they will help leverage the resources and creativity of the private sector to devise new applications and uses of the NII. The successes of the these pilot projects will create an iterative process that will generate more innovative approaches each year.

Action: Inventory NII Applications Projects. Many insights can be gained by sharing information about how government can effectively use the NII. By the end of January 1994, the IITF will complete an inventory of current and planned government activities and will widely disseminate the results through electronic and printed means. An electronic forum is being established to encourage government and private sector contributions and comments about government applications projects.

- 4. Promote Seamless, Interactive, User-Driven Operation

Because the NII will be a network of networks, information must be transferable over the disparate networks easily, accurately, and without compromising the content of the messages. Moreover, the NII will be of maximum value to users if it is sufficiently "open" and interactive so that users can develop new services and applications or exchange information among themselves, without waiting for services to be offered by the firms that operate the NII. In this way, users will develop new "electronic communities" and share knowledge and experiences that can improve the way that they learn, work, play, and participate in the American democracy.

To assure interoperability and openness of the many components of an efficient, high-capacity NII, standards for voice, video, data, and multi-media services must be developed. Those standards also must be compatible with the large installed base of communications technologies, and flexible and adaptable enough to meet user needs at affordable costs. The United States has

long relied on a consensus-based, voluntary standards-setting process in communications. Particularly in the area of information and communications technology, where product cycles are often measured in months, not years, the standards process is critical and has not always worked to speed technological innovation and serve end-users well. Government can catalyze this industry-driven process by participating more actively in private-sector standards-writing bodies and by working with industry to address strategic technical barriers to interoperability and adoption of new technologies.

To increase the likelihood that the NII will be both interactive and, to a large extent, user-driven, government also must reform regulations and policies that may inadvertently hamper the development of interactive applications. For example, government regulations concerning the lack of reimbursement of health care procedures may deter the growth of distance medicine applications.

> **Action:** Review and clarify the standards process to speed NII applications. By October 15, 1993 the Commerce Department's National Institute for Standards and Technology (NIST) will establish a panel and work with other appropriate agencies to review the government's involvement in establishing network requirements and standards with domestic and international partners. The panel, with input from the private sector and other levels of government, will consider the role of the government in the standards process and will identify opportunities for accelerating the deployment of the NII.
>
> **Action:** Review and reform government regulations that impede development of interactive services and applications. The Administration will work closely with the private sector, as well as state and local governments, to identify government policies and regulations that may hinder the growth of interactive services and applications. The IITF will determine how those regulations should be changed.

- 5. Ensure Information Security and Network Reliability

The trustworthiness and security of communications channels and networks are essential to the success of the NII. Users must be assured that information transmitted over the infrastructure will go when and where it is intended to go. Electronic information systems can create new vulnerabilities. For example, electronic files can be broken into and copied from remote locations, and cellular phone conversations can be monitored easily. Yet these same systems, if properly designed, can offer greater security than less advanced communications channels.

Through the use of information systems, gathering, sending, and receiving a wide variety of personal information is now simple, quick, and relatively inexpensive. The use of information technologies to access, modify, revise, repackage, and resell information can benefit individuals, but unauthorized use can encroach on their privacy. While media reports often emphasize the role of modern information technology in invading privacy, technology advances and enhanced management oversight also offer the opportunity for privacy protection. This protection is especially important to businesses that increasingly transmit sensitive proprietary data through electronic means. In a climate of tough global competitiveness to gain market advantage, the confidentiality of this information can spell the difference between business success or failure.

In addition, it is essential that the Federal government work with the communications industry to reduce the vulnerability of the nation's information infrastructure. The NII must be designed and managed in a way that minimizes the impact of accident or sabotage. The system must also continue to function in the event of attack or catastrophic natural disaster.

> **Action:** Review privacy concerns of the NII. The IITF has developed a work plan to investigate what policies are necessary to ensure individual privacy, while recognizing the legitimate societal needs for information, including those of law enforcement. The IITF has also developed a work plan to investigate how the

government will ensure that the infrastructure's operations are compatible with the legitimate privacy interests of its users.

Action: Review of encryption technology. In April, the President announced a thorough review of Federal policies on encryption technology. In addition, Federal agencies are working with industry to develop new technologies that protect the privacy of citizens, while enabling law enforcement agencies to continue to use court-authorized wiretaps to fight terrorism, drug rings, organized crime, and corruption. Federal agencies are working with industry to develop encryption hardware and software that can be used for this application.

Action: Work with industry to increase network reliability. The National Communications System brings together 23 Federal agencies with industry to reduce the vulnerability of the nation's telecommunications systems to accident, sabotage, natural disaster, or military attack. And the Federal Communications Commission has an industry and user Network Reliability Council to advise it on ensuring the reliability of the nation's commercial telecommunications networks. These efforts are increasingly important as the threat posed by terrorism and computing hacking grows. The NCS will continue its work and will coordinate with the IITF. In addition, the National Security Telecommunications Advisory Committee, which advises the President in coordination with the NCS, as well as the FCC's Network Reliability Council, will coordinate with and complement the work of the Advisory Council on the National Information Infrastructure.

- 6. Improve Management of the Radio Frequency Spectrum

Many of the dramatic changes expected from the development of the information infrastructure will grow out of advances in wireless technologies. The ability to access the resources of the NII at any time, from anywhere in the country, will be constrained, however, if there is inadequate spectrum available. To ensure that spectrum scarcity does not impede the development of the NII, the Administration places a high priority on streamlining its procedures for the allocation and use of this valuable resource.

Action: Streamline allocation and use of spectrum. The Administration is working with Congress to fully implement the spectrum management provisions of the Omnibus Budget and Reconciliation Act of 1993, to streamline government use of spectrum and to get spectrum to the public efficiently. These provisions will provide greater flexibility in spectrum allocation, including increased sharing of spectrum between private sector and government users, increased flexibility in technical and service standards, and increased choices for licensees in employing their assigned spectrum.

Action: Promote market principles in spectrum distribution. Further, the Administration will continue to support policies that place a greater reliance on market principles in distributing spectrum, particularly in the assignment process, as a superior way to apportion this scarce resource among the widely differing wireless services that will be a part of the NII. At the same time, the Administration will develop policies to ensure that entrepreneurs and small, rural, minority- and women-owned businesses are able to participate in spectrum auctions.

- 7. Protect Intellectual Property Rights

Development of an advanced information infrastructure will create unprecedented market opportunities and new challenges for our world-preeminent media and information industries. The broad public interest in promoting the dissemination of information to our citizens must be balanced with the need to ensure the integrity of intellectual property rights and copyrights in information and entertainment products. This protection is crucial if these products -- whether in

the form of text, images, computer programs, databases, video or sound recordings, or multimedia formats -- are to move in commerce using the full capability of the NII.

Action: Examine the adequacy of copyright laws. The IITF will investigate how to strengthen domestic copyright laws and international intellectual property treaties to prevent piracy and to protect the integrity of intellectual property. To ensure broad access to information via the NII, the IITF will study how traditional concepts of fair use should apply with respect to new media and new works.

Action: Explore ways to identify and reimburse copyright owners. The IITF will explore the need for standards for the identification of copyright ownership of information products in electronic systems (e.g., electronic headers, labels or signature techniques). The Task Force will also evaluate the need to develop an efficient system for the identification, licensing, and use of work, and for the payment of royalties for copyrighted products delivered or made available over electronic information systems.

- 8. Coordinate with Other Levels of Governmental and With Other Bodies

Domestic: Many of the firms that will likely participate in the NII are now subject to regulation by Federal, state, and local government agencies. If the information infrastructure is to develop quickly and coherently, there must be close coordination among the various government entities, particularly with respect to regulatory policy. It is crucial that all government bodies -- particularly Congress, the FCC, the Administration, and state and local governments -- work cooperatively to forge regulatory principles that will promote deployment of the NII.

Action: Seek ways to improve coordination with state and local officials. The IITF will meet with state and local officials to discuss policy issues related to development of the NII. The Task Force will also seek input from the private sector and non-federal agencies as it devises proposals for regulatory reform. The Administration is committed to working closely with state and local governments in developing its telecommunications policies.

International: The NII also will develop in the context of evolving global networks. Because customers typically demand that U.S. communications providers offer services on a global basis, it's critical that the infrastructure within this country can meet international, as well as domestic, requirements.

Action: Open up overseas markets. The Administration has shown its willingness to work directly on behalf of U.S. firms to ensure that they have an equal opportunity to export telecommunications-related goods and services to potential overseas customers. For example, the Commerce Department is developing new export control policies governing computers and telecommunications equipment manufactured by U.S. firms. These changes will remove export restrictions on many of these products and permit U.S. manufacturers to enter new markets not previously available to them. The Administration will continue to work to open overseas markets for U.S. services and products.

Action: Eliminate barriers caused by incompatible

standards. Equally important is the need to avoid trade barriers raised by incompatible U.S. and foreign standards or -- more subtly -- between the methods used to test conformance to standards. Through its participation in international standards committees, the Administration is working to eliminate or avert such barriers.

Action: Examine international and U.S. trade regulations. The IITF will coordinate the Administration's examination of policy issues related to the delivery of telecommunications services to and from the U.S., including claims by some U.S. companies that regulatory practices in foreign countries -- including denial of market access for U.S. carriers and the imposition of excessive charges for completing calls from the United States -- are harming the competitiveness of the industry and the costs charged to U.S. customers for service. The IITF also will reexamine U.S. regulation of international telecommunications services.

- 9. Provide Access to Government Information and Improve Government Procurement

Thomas Jefferson said that information is the currency of democracy. Federal agencies are among the most prolific collectors and generators of information that is useful and valuable to citizens and business. Improvement of the nation's information infrastructure provides a tremendous opportunity to improve the delivery of government information to the taxpayers who paid for its collection; to provide it equitably, at a fair price, as efficiently as possible.

The Federal government is improving every step of the process of information collection, manipulation, and dissemination. The Administration is funding research programs that will improve the software used for browsing, searching, describing, organizing, and managing information. But it is committed as well to applying those tools to the distribution of information that can be useful to the public in their various roles as teachers, researchers, businesspeople, consumers, etc.

The key questions that must be addressed are: What information does the public want? What information is in electronic form? By what means can it be distributed? How can all Americans have access to it? A secondary question is: How can government itself improve through better information management?

Action: Improve the accessibility of government information. IITF working groups will carefully consider the problems associated with making government information broadly accessible to the public electronically. Additionally, several inter-agency efforts have been started to ensure that the right information is stored and available. Finally, to help the public find government information, an inter-agency project has been formed to develop a virtual card catalogue that will indicate the availability of government information in whatever form it takes.

Action: Upgrade the infrastructure for the delivery of

government information. The Federal government has already taken a number of steps to promote wider distribution of its public reports. Legislation has been enacted to improve electronic dissemination of government documents by the Government Printing Office. A number of Federal agencies have moved aggressively to convert their public information into electronic form and disseminate it over the Internet, where it will be available to many more people than have previously had access to such information. In the future, substantial improvements will be made to "FedWorld," an electronic bulletin board established by the Department of Commerce's National Technical Information Service (NTIS), which links the public with more than 100 Federal bulletin boards and information centers. These improvements will enhance FedWorld's ability to distribute to the public scientific, technical, and business-related information generated by the U.S. Government and other sources. Finally, a conference will be held in the Fall of 1993 to begin teaching Federal employees how they can use these distribution mechanisms.

Action: Enhance citizen access to government information. In June 1993, OMB prescribed new polices pertaining to the acquisition, use, and distribution of government information by Federal agencies. Among other things, the policies mandate that, in distributing information to the public, Federal agencies should recoup only those costs associated with the dissemination of that information, not with its creation or collection. Moreover, a number of inter-agency efforts are under way to afford greater public access to government information. One project seeks to turn thousands of local and field offices of various Federal agencies into Interactive Citizen Participation Centers, at which citizens can communicate with the public affairs departments of all Federal agencies.

Action: Strengthen inter-agency coordination through the use of electronic mail. To implement the National Performance Review's recommendation on expanded use of electronic mail within the Federal government, an inter-agency coordinating body has been established to incorporate electronic mail into the daily work environment of Federal workers. The group is also sponsoring three pilot projects to expand connectivity that will build a body of experience that other Federal agencies can draw on when they begin to use electronic mail.

Action: Reform the Federal procurement process to make government a leading-edge technology adopter. The Federal government is the largest single buyer of high technology products. The government has played a key role in developing emerging markets for advanced technologies of military significance; it can be similarly effective for civilian technologies. The Administration will implement the procurement policy reforms set forth in the National Performance Review report.

VI. America's Destiny is Linked to our Information Infrastructure

The principles and goals outlined in this document provide a blueprint for government action on the NII. Applying them will ensure that government provides constructive assistance to U.S. industry, labor, academia and private citizens as they develop, deploy and use the infrastructure.

The potential benefits for the nation are immense. The NII will enable U.S. firms to compete and win in the global economy, generating good jobs for the American people and economic growth for the nation. As importantly, the NII promises to transform the lives of the American people. It can ameliorate the constraints of geography and economic status, and give all Americans a fair opportunity to go as far as their talents and ambitions will take them.

Executive Summary  Benefits

Benefits and Applications of the National Information Infrasructure

The development of the National Information Infrastructure is not an end in itself; it is a means by which the United States can achieve a broad range of economic and social goals. Although the NII is not a "silver bullet" for all of the problems we face, it can make an important contribution to our most pressing economic and social challenges.

This infrastructure can be used by all Americans, not just by scientists and engineers. As entrepreneurs, factory workers, doctors, teachers, federal employees, and citizens, Americans can harness this technology to:

- Create jobs, spur growth, and foster U.S. technological leadership;
- Reduce health care costs while increasing the quality of service in underserved areas;
- Deliver higher-quality, lower-cost government services;
- Prepare our children for the fast-paced workplace of the 21st century; and
- Build a more open and participatory democracy at all levels of government.

This is not a far-fetched prediction. As shown below, our current information infrastructure is already making a difference in the lives of ordinary Americans, and we have just begun to tap its potential.

Economic Benefits

The National Information Infrastructure will help create high-wage jobs, stimulate economic growth, enable new products and services, and strengthen America's technological leadership. Whole new industries will be created, and the infrastructure will be used in ways we can only begin to imagine. Below are some of the potential benefits to the U.S. economy:

- 1. Increased economic growth and productivity
    - The Computer Systems Policy Project estimates that the NII will "create as much as $300 billion annually in new sales across a range of industries."
    - The Economic Strategy Institute concluded that accelerated deployment of the NII would increase GDP by $194 - $321 billion to GNP by the year 2007, and increase productivity by 20 to 40 percent.
- 2. Job creation

  Although there are no definitive estimates for the total number of U.S. jobs the deployment of the NII will create, it is clear that it has the potential to create hundreds of thousands of jobs. For example:

  > Industry experts believe that the Personal Communications Services industry, a new family of wireless services, could create as many as 300,000 jobs in the next 10-15 years. The development of this industry will be accelerated by the Emerging Telecommunications Technology Act, which was signed by President Clinton as part of the budget package.

- 3. Technological leadership

The NII will serve as the driver for a wide variety of technologies, such as semiconductors, high-speed networking, advanced displays, software, and human/computer interfaces such as speech recognition.

This technology will be used to create exciting new products and services, strengthening U.S. leadership in the electronics and information technology sector. For example, experts envision the production of powerful computers that will be held in the palm of our hand, "as mobile as a watch and as personal as a wallet, ... [they] will recognize speech, navigate streets, take notes, keep schedules, collect mail, manage money, open the door and start the car, among other computer functions we cannot imagine today."

- 4. Regional, state, and local economic development

In today's knowledge-based, global economy in which capital and technology are increasingly mobile, the quality of America's information infrastructure will help determine whether companies invest here or overseas. States and regions increasingly recognize that development of their information infrastructure is key to creating jobs and attracting new businesses:

  - In May 1993, Governor Jim Hunt announced the creation of the North Carolina Information Highway, a network of fiber optics and advanced switches capable of transmitting the entire 33-volume Encyclopedia Britannica in 4.7 seconds. This network, which will be deployed in cooperation with BellSouth, GTE, and Carolina Telephone, is a key element of North Carolina's economic development strategy.

  - In California's Silicon Valley, academics, business executives, government officials, and private citizens are working together to build an "advanced information infrastructure and the collective ability to use it." A non-profit organization, Smart Valley Inc., will help develop the information infrastructure and its applications. Many business applications are envisioned, including desktop videoconferencing, rapid delivery of parts designs to fabrication shops, design of chips on remote supercomputers, electronic commerce, and telecommuting.

  - The Council of Great Lakes Governors has developed a regional telecommunications initiative, which includes creating an open data network as a first step towards creation of a Great Lakes Information Highway, promoting access in rural areas, developing a set of telecommunications service goals and a time table for achieving them, and developing a computerized inventory of each state's advanced telecommunications infrastructure.

- 5. Electronic commerce

Electronic commerce (e.g., on-line parts catalogues, multi- media mail, electronic payment, brokering services, collaborative engineering) can dramatically reduce the time required to design, manufacture, and market new products. "Time to market" is a critical success factor in today's global marketplace.

Electronic commerce will also strengthen the relationships between manufacturer, suppliers, and joint developers. In today's marketplace, it is not unusual to have 12 or more companies collaborating to develop and manufacture new products.

Health Care

The NII can help solve America's health care crisis. The Clinton Administration is committed to health care reform that will ensure that Americans will never again lose their health care coverage and that controls skyrocketing health care costs. The costs of doing nothing are prohibitive:

- Since 1980, our nation's health care costs have quadrupled. Between 1980 and 1992, health expenditures shot up from 9 percent to 14 percent of GDP; under current policies, they will hit 19 percent by the year 2000. Health care cost increases will eat up more than half of the new federal revenue expected over the next four years.

- Twenty-five cents out of every dollar on a hospital bill goes to administrative costs and does not buy any patient care. The number of health care administrators is increasing four times faster than the number of doctors.

These problems will not be solved without comprehensive health care reform. Better use of information technology and the development of health care applications for the NII, however, can make an important contribution to reform. Experts estimate that telecommunications applications could reduce health care costs by $36 to $100 billion each year while improving quality and increasing access.

Below are some of the existing and potential applications:

- 1. Telemedicine: By using telemedicine, doctors and other care givers can consult with specialists thousands of miles away; continually upgrade their education and skills; and share medical records and x-rays.

  Example: In Texas, over 70 hospitals, primarily in rural areas, have been forced to close since 1984. The Texas Telemedicine Project in Austin, Texas offers interactive video consultation to primary care physicians in rural hospitals as a way of alleviating the shortage of specialists in rural areas. This trial is increasing the quality of care in rural areas and providing at least 14 percent savings by cutting patient transfer costs and provider travel.

- 2. Unified Electronic Claims: More than 4 billion health care claims are submitted annually from health care providers to reimbursement organizations such as insurance companies, Medicare, Medicaid, and HMOs. Moreover, there are 1500 different insurance companies in the United States using many different claims forms. The administrative costs of the U.S. health care system could be dramatically reduced by moving towards standardized electronic submission and processing of claims.

- 3. Personal Health Information Systems: The United States can use computers and networks to promote self care and prevention by making health care information available 24 hours a day in a form that aids decision making. Most people do not have the tools necessary to become an active and informed participant in their own health care. As a result, far too many people (estimates range from 50 to 80 percent) entering the health care system do not really need a physician's care. Many improperly use the system by, for example, using the emergency room for a cold or back strain. Many of those who end up with serious health problems enter the health care system too late, and thus require more extensive and costly therapy. Michael McDonald, chairman of the Communications and Computer Applications in Public Health (CCAPH), estimates that even if personal health information systems were used only 25 to 35 percent of the time, $40 to $60 billion could be saved.

  Example: InterPractice Systems, a joint venture of Harvard Community Health Plan in Boston and Electronic Data Systems, has placed terminals in the homes of heavy users of health care, such as the elderly, pregnant women, and families with young children. Based on a patient's symptoms and their medical history, an electronic advice system makes recommendations to HCHP's members about using self care, talking with a doctor, or scheduling an appointment. In one instance, "an 11-year old who regularly played with the terminal heard his father complain one day of chest pains and turned to the system for help; it diagnosed the symptoms as a probable heart attack. The diagnosis was correct."

- 4. Computer-Based Patient Records: The Institute of Medicine has concluded that Computer-Based Patient Records are critical to improving the quality and reducing the cost

of health care. Currently:

- 11 percent of laboratory tests must be re-ordered because of lost results;
- 30 percent of the time, the treatment ordered is not documented at all;
- 40 percent of the time a diagnosis isn't recorded; and
- 30 percent of the time a medical record is completely unavailable during patient visits.

Civic Networking: Technology in the Public Interest

The benefits of the NII extend far beyond economic growth. As the Center for Civic Networking observed,

> "A country that works smarter; enjoys efficient, less costly government, guided by a well-informed citizenry; that produces high quality jobs and educated citizens to fill them; that paves a road away from poverty; that promotes life-long learning, public life and the cultural life of our communities. This is the promise of the National Information Infrastructure."

The NII could be used to create an "electronic commons" and promote the public interest in the following ways:

- 1. Community Access Networks: Grass-roots networks are springing up all over the country, providing citizens with a wide range of information services. The National Information Infrastructure should expand a citizen's capacity for action in local institutions, as it must honor regional differences and the cultural diversity of America's heritage.

  Example: The Heartland FreeNet in Peoria, Illinois provides a wide range of community information to the citizens of Central Illinois 24 hours a day. Topics covered include 113 areas of social services; a year long community calendar; the American Red Cross; current listings from the Illinois Job Service; resources for local businesses; and local government information. Experts in all fields from law to the Red Cross to chemical dependency volunteer their time and expertise to answer questions anonymously asked by the public.

  Example: The Big Sky Telegraph began operation in 1988 as an electronic bulletin board system linking Montana's 114 one-room schools to each other and to Western Montana College. Today, the Big Sky Telegraph enables the formation of "virtual communities" -- linking schools, libraries, county extension services, women's centers, and hospitals. Montana's high-school students learning Russian can now communicate with Russian students, and science students are participating in a course on "chaos theory" offered by MIT.

- 2. Dissemination of government information: The free flow of information between the government and the public is essential to a democratic society. Improvements in the National Information Infrastructure provide a tremendous opportunity to improve the delivery of government information to the taxpayers who paid for its collection; to provide it equitably, at a fair price, as equitably as possible.

  Example: Some of the most powerful examples of the power inherent in information collection and dissemination come from the experience of Federal agencies. For example, the Emergency Planning and Community Right-to-Know Act of 1986 established a Toxic Release Inventory (TRI), which required industries to report their estimated total releases of toxic chemicals to the environment. The Environmental Protection Agency has used a

variety of means for making the data available to the public, including a collaborative effort involving the agency, the nonprofit community, and philanthropy. This effort involved making the TRI available through an online service called RTK NET (the Right-to-Know Computer Network), operated by OMB Watch and Unison Institute.

As a result of the TRI program, EPA and industry developed the "33/50" program, in which CEOs set a goal of reducing their pollution by 33 percent by 1992 and 50 percent by 1995. Because of RTK NET's success, EPA is seeking to expand the information available on the service.

- 3. Universal access: The NII must be used to bring Americans together, as opposed to allowing a further polarization between information "haves" and "have nots."

  Example: As part of a recent cable franchise negotiation, fiber optic cable was deployed in Harlem, where 40 percent of the residents live below the poverty line. New York City is exploring the use of interactive video conferencing between community rooms in housing projects and government offices, schools, and New York corporations. These facilities could be used to teach parenting to teenage mothers, and promote mentoring programs between inner city youth and employees of New York corporations.

Research

One of the central objectives of the High Performance Computing and Communications Initiative (HPCCI) is to increase the productivity of the research community and enable scientists and engineers to tackle "Grand Challenges," such as forecasting the weather, building more energy-efficient cars, designing life- saving drugs, and understanding how galaxies are formed.

As a result of advances in computing and networking technologies promoted by the HPCCI, America's scientists and engineers (and their colleagues and peers around the world) are able to solve fundamental problems that would have been impossible to solve in the past. U.S. researchers will continue to benefit from the HPCCI and the emerging National Information Infrastructure. Below are just a few of the ways in which this technology is being used by U.S. researchers:

- 1. Solving Grand Challenges: As a result of investments in high performance computers, software, and high-speed networks, researchers have access to more and more computational resources. As a result, scientists and engineers have been able to more accurately model the Earth's climate; design and simulate next-generation aircraft (the High Speed Civil Transport); improve detection of breast cancer by turning two-dimensional MRI images into three-dimensional views; and enhance the recovery of oil and gas from America's existing reservoirs.

- 2. Enabling remote access to scientific instruments: Because of advancements in networks and visualization software, scientists can control and share remote electron microscopes, radio telescopes, and other scientific instruments.

- 3. Supporting scientific collaboration: The Internet has allowed scientists in the United States and around the world to access databases, share documents, and communicate with colleagues. For example, one computer language was developed by 60 people in industry, government and academia over a period of 3 years with only two days of face-to-face meetings. Instead, project participants sent 3,000 e-mail messages to each other, dramatically reducing the time required to develop the language. As scientific research becomes increasingly complex and interdisciplinary, scientists see the need to develop "collaboratories," centers without walls in which "the nations' researchers can perform their research without regard to geographical location -- interacting with colleagues, access instrumentation, sharing data and computational resources, [and] accessing information in digital libraries."

Life Long Learning

Increasingly, what we earn depends on what we learn. Americans must be well-educated and well-trained if we are compete internationally and enjoy a healthy democracy. The magnitude of the challenge we face is well-known:

- 25 percent of students nation-wide no longer complete high-school, a figure which rises to 57 percent in some large cities.
- Currently, 90 million adults in the United States do not have the literacy skills they need to function in our increasingly complex society.

The Clinton Administration has set ambitious national goals for lifelong learning. The"Goals 2000: Educate America Act" would make six education goals part of national policy: 90 percent high school graduation rate; U.S. dominance in math and science; total adult literacy; safe and drug-free schools; increased competency in challenging subjects; and having every child enter school "ready to learn." Secretary of Labor Robert Reich also has emphasized the need to move towards "new work." New work requires problem-solving as opposed to rote repetition, upgrading worker skills, and empowering front-line workers to continuously improve products and services. All of the Administration's policy initiatives (national skill standards, school-to-work transition, training for displaced workers) are aimed at promoting the transition towards high-wage, higher-value "new work."

Although technology alone can not fix what is wrong with America's education and training system, the NII can help. Studies have shown that computer-based instruction is cost- effective, enabling 30% percent more learning in 40% less time at 30% less cost. Fortune recently reported that:

> "From Harlem to Honolulu, electronic networks are sparking the kind of excitement not seen in America's classrooms since the space race ... In scores of programs and pilot projects, networks are changing the way teachers teach and students learn."

The United States has just begun to exploit the educational applications of computers and networks. Students and teachers can use the NII to promote collaborative learning between students, teachers, and experts; access on-line "digital libraries"; and take "virtual" field trips to museums and science exhibits without leaving the classroom.

Example: Headquartered in Cambridge, Massachusetts and funded by the National Science Foundation, the Global Laboratory Project links students from over 101 schools in 27 states and 17 foreign countries, including Japan, Saudi Arabia, Russia and Argentina. All over the world, students establish environmental monitoring stations to study climate change, monitor pollutants such as pesticides and heavy metals, and measure ultraviolet radiation. Students share their data over the Global Lab telecommunications network with each other and with scientists to make comparisons, conduct analyses, and gain a global perspective on environmental problems.

Example: In Texas, the Texas Education Network (TENET) now serves over 25,000 educators, and is making the resources of the Internet available to classrooms. One Texas educator from a small school district described the impact it was having on the learning experiences of children:

> "The smaller districts can now access NASA, leave messages for the astronauts, browse around in libraries larger than ever they will ever be able to visit, discuss the Superconducting Supercollider project with the physicist in charge, discuss world ecology with students in countries around the world, read world and national news that appears in newspapers that are not available in their small towns, work on projects as equals and collaborators with those in urban areas, and change the way

> they feel about the size of their world. This will create students that we could not create otherwise. This is a new education and instruction."

As computers become more powerful and less expensive, students may eventually carry hand-held, computer-based "intelligent tutors," or learn in elaborate simulated environments. One expert predicted the following educational use of virtual reality:

"Imagine a biology student entering an immersive virtual laboratory environment that includes simulated molecules. The learner can pick up two molecules and attempt to fit them together, exploring docking sites. In addition to the three-dimensional images in the head-mounted display, the gesture gloves on his hands press back to provide feedback to his sense of touch. Alternatively, the student can expand a molecule to the size of a large building and fly around in it, examining the internal structure."

Creating a Government that Works Better and Costs Less

The Vice President Gore's National Performance Review (NPR) provides a bold vision of a federal government which is effective, efficient and responsive. Moving from red tape to results will require sweeping changes: emphasizing accountability for achieving results as opposed to following rules; putting customers first; empowering employees; and reengineering how government agencies do their work. As part of this vision, the NPR emphasizes the importance of information technology as a tool for reinventing government:

> "With computers and telecommunications, we need not do things as we have in the past. We can design a customer- driven electronic government that operates in ways that, 10 years ago, the most visionary planner could not have imagined."

The NPR has identified a number of ways in which "electronic government" can improve the quality of government services while cutting costs, some of which are described below:

- 1. Develop a nationwide system to deliver government benefits electronically: The government can cut costs through "electronic benefits transfer" for programs such as federal retirement, social security, unemployment insurance, AFDC, and food stamps. For example, 3 billion Food Stamps are printed and distributed to over 10 million households. Estimates suggest that $1 billion could be saved over five years once electronic benefits for food stamps is fully implemented.

- 2. Develop integrated electronic access to government information and services: Currently, citizen access to federal government information is uncoordinated and not customer-friendly. Electronic kiosks and computer bulletin boards can result in quick response, complete information, and an end to telephone tag.

  Example: Info/California is a network of kiosks in places like libraries and shopping malls. Californians can use these touch-screen computers to renew vehicle registration, register for employment openings, and get information on 90 different subjects, such as applying for student loans or resolving tenant-landlord disputes. These kiosks have reduced the cost of job- match services from $150 to $40 per person.

- 3. Establish a National Law Enforcement/Public Safety Network: Whether responding to natural or technological disasters, or performing search and rescue or interdiction activities, federal, state, and local law enforcement and public safety workers must be able to communicate with each other effectively, efficiently, and securely. Currently, federal, state and local law enforcement agencies have radio systems which can not communicate with each other because they occupy different parts of the spectrum.

- 4. Demonstrate and Provide Governmentwide Electronic Mail: Government-wide e-mail

can provide rapid communications among individuals and groups, break down barriers to information flows between and within agencies, allow better management of complex interagency projects, and permit more communication between government officials and the public.

Agenda for Action  Task Force

THE INFORMATION INFRASTRUCTURE TASK FORCE

Mission

While the private sector will build and run virtually all of the National Information Infrastructure (NII), the President and the Vice President have stated clearly that the Federal government has a key leadership role to play in its development. Accordingly, the White House formed the Information Infrastructure Task Force (IITF) to articulate and implement the Administration's vision for the NII. The task force consists of high-level representatives of the Federal agencies that play a major role in the development and application of information technologies. Working together with the private sector, the participating agencies will develop comprehensive telecommunications and information policies that best meet the needs of both the agencies and the country. By helping build consensus on thorny policy issues, the IITF will enable agencies to make and implement policy more quickly and effectively.

A high-level Advisory Council on the National Information Infrastructure has been established by Executive Order to provide advice to the IITF. It will consist of representatives of the many different stakeholders in the NII, including industry, labor, academia, public interest groups, and state and local governments. The Secretary of Commerce will appoint the 25 members of the advisory committee.

The IITF is working closely with the High Performance Computing, Communications, and Information Technology (HPCCIT) Subcommittee of the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET), which is chaired by the White House Office of Science and Technology Policy. The HPCCIT Subcommittee provides technical advice to the IITF and coordinates Federal research activities that support development of the National Information Infrastructure.

Membership

All the key agencies involved in telecommunications and information policy are represented on the task force. The task force operates under the aegis of the White House Office of Science and Technology Policy and the National Economic Council. Ron Brown, the Secretary of Commerce, chairs the IITF, and much of the staff work for the task force will be done by the National Telecommunications and Information Administration (NTIA) of the Department of Commerce.

Structure

To date, three committees of the IITF have been established:

(1) Telecommunications Policy Committee, which will formulate a consistent Administration position on key telecommunications issues, is chaired by Larry Irving, head of the National Telecommunications and Information Administration of the Department of Commerce. Recently, the Committee created:

- The Working Group on Universal Service, which will work to ensure that all Americans have access to and can enjoy the benefits of the National Information Infrastructure.

(2) Information Policy Committee, which is addressing critical information policy issues that must be addressed if the National Information Infrastructure is to be fully deployed and utilized. Sally Katzen, head of the Office of Information and Regulatory Affairs at the Office of Management and Budget (OMB), chairs the Committee. The Committee has created three working groups:

- The Working Group on Intellectual Property Rights, to develop proposals for protecting copyrights and other IPR in an electronic world. Bruce Lehman, head of the Patent and Trademark Office of the Department of Commerce, chairs this group.

- The Working Group on Privacy, to design Administration policies to protect individual privacy despite the rapid increase in the collection, storage, and dissemination of personal data in electronic form. It is chaired by Pat Faley, Acting Director of the Office of Consumer Affairs, Department of Health and Human Services.

- The Working Group on Government Information focuses on ways to promote dissemination of government data in electronic form. Bruce McConnell, OMB's Office of Information and Regulatory Affairs, chairs this group.

(3) Applications Committee, which coordinates Administration efforts to develop, demonstrate, and promote applications of information technology in manufacturing, education, health care, government services, libraries, and other areas. This group works closely with the High-Performance Computing and Communications Program, which is funding development of new applications technologies, to determine how Administration policies can best promote the deployment of such technologies. Arati Prabhakar, Director of the National Institute of Standards and Technology, chairs the committee. This committee is responsible for implementing many of the recommendations of the Vice President's National Performance Review that pertain to information technology. So far, the Committee has created one working group:

- The Working Group on Government Information Technology Services (GITS) will coordinate efforts to improve the application of information technology by Federal agencies.

Benefits  Advisory Council

United States Advisory Council on the National Information Infrastructure

- The President will sign an Executive Order creating the "United States Advisory Council on the National Information Infrastructure" to facilitate private sector input to the Information Infrastructure Task Force. The IITF, which is chaired by the Secretary of Commerce, will work with Congress and the private sector to propose the policies and initiatives needed to accelerate deployment of the NII.
- The Council will consist of not more than 25 senior-level individuals to be named by the Secretary of Commerce this year. A chair and/or vice chair will be appointed by the Secretary from among the Council members.
- Nominations will be solicited from a variety of NII constituencies and interest groups. The IITF and its committees also will use other mechanisms to solicit public input to ensure that it hears the views of all interested parties.
- The Council will be broadly representative of the key constituencies impacted by the NII, including business, labor, academia, public interest groups, and state and local governments.
- The Council shall advise the IITF on matters related to the development of the NII, such as: the appropriate roles of the private and public sectors in NII development; a vision for the evolution of the NII and its public and commercial applications; the impact of current and proposed regulatory regimes on the evolution of the NII; privacy, security, and copyright issues; national strategies for maximizing interconnection and interoperability of communications networks; and universal access.
- The Council is expected to invite experts to submit information to the Council and form subcommittees of the Council to review specific issues.
- The Department of Commerce will act as "secretariat" for the Council, providing administrative services, facilities, staff and other support services.
- The Council will exist for two years unless its charter is extended.
- The Council will be separate from, and complementary to, the High Performance Computing Advisory Committee, which will be established to provide private sector input on the High Performance Computing and Communications Initiative.

Task Force  Accomplishments

Administration NII Accomplishments

During its first seven months, the Clinton-Gore Administration has taken major steps to make its vision of the National Information Infrastructure a reality:

- **1. Freeing up spectrum to create information "skyways":**
  - The President recently signed the Emerging Telecommunications Technology Act, which directs the Secretary of Commerce to transfer, over a ten-year period, at least 200 MHz of spectrum now used by federal agencies to the FCC for subsequent licensing to the private sector. It allows the FCC to use competitive bidding to grant new license assignments for spectrum.
  - This will create high-tech jobs and accelerate the development of new wireless industries such as Personal Communications Services. The entire cellular industry, which has created 100,000 jobs, was created by licensing only 50 MHz of spectrum.
- **2. Reinventing Government:**
  - The Administration is committed to using "electronic government" to ensure that the federal government works better and costs less.
  - As part of the National Performance Review, the Vice President has identified a number of concrete ways to use information technology to cut costs and improve services, such as electronic benefits transfer; access to government information and services through electronic "kiosks"; a national law enforcement/public safety network; and electronic procurement.
- **3. Investing in technology:**

  The President's FY 1994 budget includes:
  - $1.1 billion for the High-Performance Computing and Communications Initiative, including a new $100 million program to develop applications in areas such as education, manufacturing, health, and digital libraries. The House has passed legislation which would authorize these new programs; Senate action is expected in the fall of 1993.
  - $50 million for NTIA grants to demonstrate the applications of the NII for non-profit institutions such as schools, hospitals, and libraries.
  - $40 million for research by the Department of Energy's National Labs on the information infrastructure.

  The ARPA-led Technology Reinvestment Project (TRP), funded at $472 million in FY 1993, has generated almost 3,000 proposals from the private sector, requesting a total of $8.5 billion. Many of these proposals are for technology development for the National Information Infrastructure and its applications in health care, manufacturing, electronic commerce, and education and training. The President recently endorsed increasing the funding of the TRP to $600 million for FY 1994.
- **4. Making government information more available to citizens:**
  - The Office of Management and Budget issued a new policy in June (OMB Circular A-130) to encourage agencies to increase citizen access to public information.
  - Also in June, the President and Vice President announced that the White House would be accessible to the public via electronic mail. The Administration is using on-line information

services and the Internet to make available speeches, press briefings, executive orders, and a summary of the budget.

- **5. Creating the right environment for private sector investment in the National Information Infrastructure:**
    - The President has signed into law tax incentives for private sector investment in R&D and new business formation, including a three-year extension of the R&D credit and a targeted capital gains reduction for investments in small businesses. Both of these tax incentives will help spur the private sector investment needed to develop the National Information Infrastructure.

Advisory Council  Key Contacts

ADMINISTRATION NII INFORMATION SOURCES

To submit comments on "The National Information Infrastructure: Agenda for Action" or to request additional copies of this package:

Write: NTIA NII Office
15th Street and Constitution Avenue
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Call: 202-482-1840
Fax: 202-482-1635
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To obtain copies of this package electronically see instructions on next page.

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The package is available in ASCII format from a variety of electronic sources including the following:

1. Internet

The package is available in ASCII format through both FTP and Gopher. The name of the file is "niiagenda.asc". Access information and directories are described below.

FTP:

- Address: ftp.ntia.doc.gov Login as "anonymous". Use your email address or guest as the password. Change directory to "pub".
- Address: enh.nist.gov Login as "anonymous" using "guest" as the password.
- Address: isdres.er.usgs.gov Login as "anonymous". Use your email address or "guest" as the password. Change directory to npr.

The package also may be present in a self extracting compressed file named "niiagend.exe". Remember to issue the binary command before "getting" the compressed file.

Gopher (server/client):

- Telnet to: gopher.nist.gov login as "gopher". Choose the menu item "DOC Documents". Choose "niiagenda.asc".
- Gopher to: ace.esusda.gov, port 70
  Select:
  - 6. Americans Communicating Electronically
  - 3. National Technology Information

- 1. National Information Infrastructure Agenda

Email

- Send a message to ace-request@ace.esusda.gov In the body of the message put: send niiagenda

2. Bulletin Boards

The package is available for downloading on the following bulletin boards:

Name: NTIA Bulletin Board
Phone: (202) 482-1199

Communications parameters should be set to either 2400 or 9600 baud, no parity, 8 data bits and 1 stop bit. The package is available under the "press releases" menu item as "niiagend.asc" (ascii) and "niiagend.exe" (compressed-self extracting).

Name: Department of Commerce Economic Bulletin Board
Phone: 202-482-1986 (voice instructions for subscription information)

This is a "fee for service" bulletin board. Subscribers may download the "niiagenda" document for normal on-line charges. Non-subscribers may subscribe for $35 and download the report for no additional charge. Free telnet access and download services are available through the Internet by using the address: ebb.stat-usa.gov. Use trial as your user id.

Name: FedWorld On-line Information Network
Phone: (703) 321-8020

Communications parameters should be set to either 2400 or 9600 baud, no parity, 8 data bits and 1 stop bit. To access "niiagend.asc" from the FedWorld menu, enter "". Telnet access is available through the Internet using the address: fedworld.doc.gov. Further information about FedWorld can be obtained by calling (voice) 703-487- 4648.

Accomplishments 

Clinton Presidential Records
Digital Records Marker

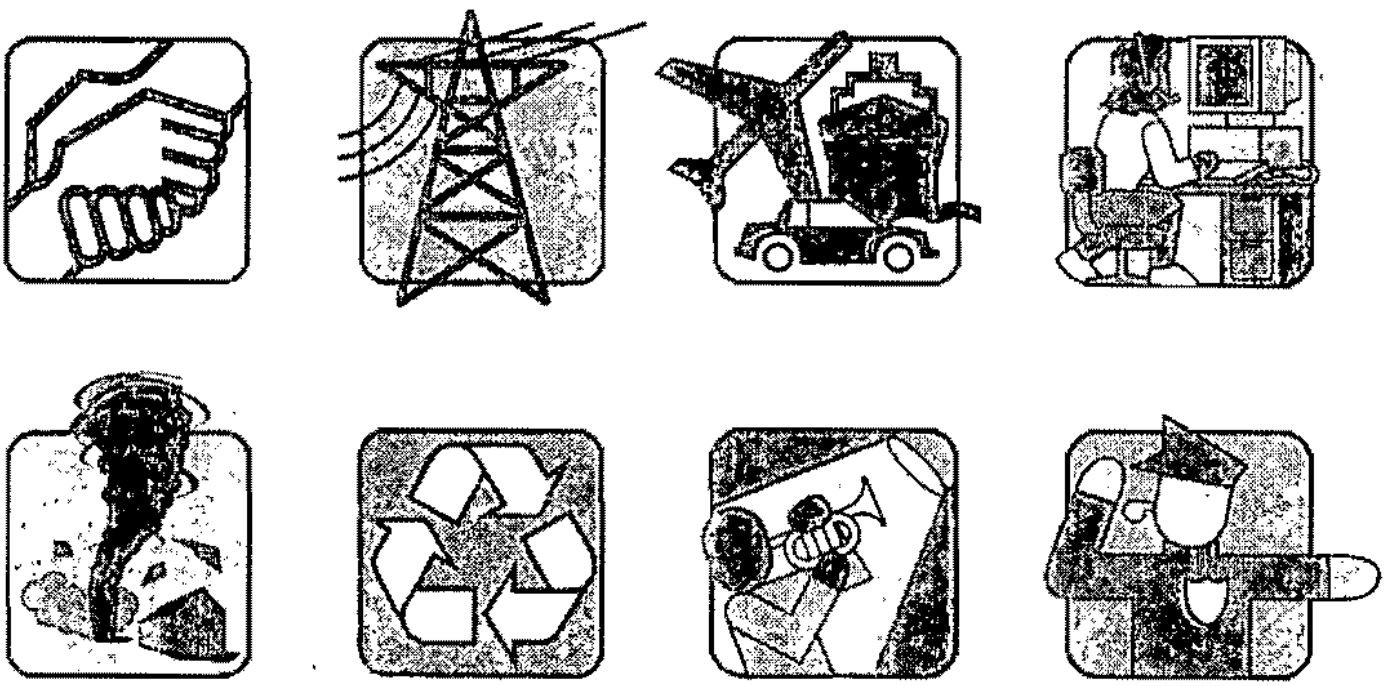
This is not a presidential record. This is used as an administrative marker by the William J. Clinton Presidential Library Staff.

This marker identifies the place of a publication.

Publications have not been scanned in their entirety for the purpose of digitization. To see the full publication please search online or visit the Clinton Presidential Library's Research Room.

The Information Infrastructure: Reaching Society's Goals

Report of the Information Infrastructure Task Force
Committee on Applications and Technology



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