

# **A History of the Committee on Science and Technology, U.S. House of Representatives 1958-2008**

## **America, Science, and *Sputnik***

On October 4, 1957, the Soviet Union startled the political and scientific world with the launch of a 184-pound satellite called *Sputnik* into a 143 to 584 mile high orbit around the Earth. This event would reverberate for more than a decade, and was summarized by Georgia Senator Richard Russell: “*Sputnik* confronts America with a new and terrifying military danger and a disastrous blow to our prestige.” The United States faced a new level of intensive international scientific competition, and the individuals tasked with the job of tackling this dangerous situation would have to dramatically refocus the nation’s scientific and educational efforts. Shocked Americans were forced to question their nation’s longstanding belief in its own scientific and technological superiority.

America had become the world leader in the sciences in part by welcoming many top European scientists who were fleeing Nazi persecution in the 1930s and 1940s. Scientists from many European countries sought teaching and research positions in the nation’s best universities prior to the war. During World War II, scientists such as Enrico Fermi, Hans Bethe, and Edward Teller joined the Manhattan Project to build an atomic bomb. Other physicists like Walter Elsasser refused to work in weapons research. He lent his expertise to the study of meteorology and the physical properties of the atmosphere regarding radio transmissions, while Léon Brillouin employed his talents in the field of radar research. Scientists of that generation were trained in an environment based on the premise that scientific progress and professional judgments would be the model for the development of a better society. In conjunction with the change in the scientific world, the United States government had revolutionized its relationship with its citizens through the implementation of the New Deal. With the convergence of these two forces, Americans by 1945 had come to an almost unquestioning belief in the benefits of science and technology.

At the conclusion of World War II, scientists returned to academia and pursued research to gain a better understanding of nature from the subatomic level to the immensity of the universe. In a desire to maintain its advantage over any potential adversary, America made every attempt in 1945 to augment its scientific resources by bringing

the best German scientists to the United States. One of the most important programs was code named Operation Paperclip and sought to utilize such German scientists as Wernher von Braun to develop rockets. Von Braun was Germany's leading scientist in the V2 rocket program, which would prove to be the foundation for America's effort to land a man on the moon.

Although the United States and the Soviet Union had actively pursued attempts to reach the threshold of space through rocket development during the early 1950s, both nations made a concerted effort in 1957 to launch a satellite to assert its national prestige and fulfill the promise of learning more about our own planet as part of the International Geophysical Year, July 1957-1958. This worldwide scientific effort led to such discoveries as the Van Allen radiation belt around the Earth, a better understanding of the oceans, and establishment of permanent research stations in Antarctica. In the arena of space exploration, few Americans thought the Russian's centralized system capable of being the first nation to launch a satellite into Earth orbit. In the wake of *Sputnik*, the United States quickly attempted to catch up by launching its own satellite aboard the Vanguard rocket on December 6, 1957. It ended in dismal failure as the rocket achieved an altitude of only a few feet before exploding, which the public watched on television broadcasts during the following week. This and other setbacks led many Americans to question their long held belief in the nation's scientific superiority and the advisability of having the nation's space effort placed in the hands of so many diverse organizations such as the Army, Navy, and Air Force, as well as civilian agencies. The first successful American missile launch on January 31, 1958, was through a joint effort led by von Braun at the Army Ballistic Missile Agency in Huntsville, Alabama, and the Jet Propulsion Laboratory in Pasadena, California.

DOD also immediately understood the potential threat posed by a Russian missile launch with an atomic bomb on the top of a rocket instead of a satellite. As part of its response, DOD created the Advanced Research Projects Agency (ARPA) in February 1958 to counter Soviet military technology capabilities. DOD also accepted the need to establish and put into place long term research and development projects. In 1960, the nonmilitary space programs under ARPA came under the jurisdiction of a newly formed congressional committee.

### **The Select Committee**

In light of the success of the Soviet space program and after preliminary discussions with other leaders in the U.S. House of

Representatives, Speaker Sam Rayburn on March 5, 1958, moved to create a Select Committee on Astronautics and Space Exploration with the authority to study all facets of the American space effort. To fulfill its responsibilities, the House provided the Select Committee with the jurisdiction to utilize all necessary government facilities and personnel resources. To lead the first completely new committee created since 1892, Rayburn turned to Majority Leader John McCormack of Massachusetts and Minority Leader Joseph Martin, also of Massachusetts, who readily agreed to join the new committee in order to ensure bipartisanship. McCormack and Martin proceeded to choose Members based on their expertise. On the Democratic side, McCormack selected Overton Brooks from Louisiana who served with Carl Vinson on the Armed Forces Committee. Brooks Hays of Arkansas came to the Committee from Foreign Affairs, and Leo O'Brian of New York moved over from the Commerce Committee. From the important Appropriations Committee, McCormack picked William Natcher from Kentucky, and Martin tapped Gerald Ford of Michigan. McCormack completed his majority by naming Lee Metcalf of Montana from the Education and Labor Committee and B. F. Sisk of California who served on the Interior Committee. In order to add balance to the Select Committee, Martin named Minority Whip Leslie Arends of Illinois from the Armed Forces Committee and Kenneth Keating of New York from the Judiciary Committee. Gordon McDonough of California joined the minority from the Joint Committee on Defense Production, and James Fulton of Pennsylvania came over from Foreign Affairs.

During the spring and summer of 1958, the Select Committee held hearings on the nation's space projects. To coordinate the nation's space program, the Select Committee crafted the National Aeronautics and Space Act of 1958, which President Dwight Eisenhower signed into law on July 29, 1958. This law created NASA, and the new agency would absorb its predecessor, the National Advisory Committee for Aeronautics (NACA). President Woodrow Wilson had created NACA in 1915 to research aeronautics for government and commercial enterprises. During its 43 years, NACA provided the nation with invaluable information on aeronautics, sponsored the XS-1 program in high speed and altitude flights, and in 1952 developed spacecraft designs to ensure safe reentry into Earth's atmosphere.

The Select Committee also created the National Aeronautics and Space Council (NASC) in the 1958 act, in order to coordinate NASA's programs with other government and international agencies. President Eisenhower objected to Senate Majority Leader Lyndon Johnson's initial proposal of a board because it infringed upon executive

authority, but Eisenhower agreed to the creation of NASC as a policy advisory group with the president as the chairman. NASC included the secretaries of State and Defense, NASA administrator, chairman of the AEC, and other presidential appointees. The council also had an executive secretary who was allowed to hire a staff. In addition to the creation of NASA and NASC in the 1958 act, the Select Committee put in place initial guidelines to define intellectual property rights, a major issue as government employees, private corporations, and individual scientists were collaborating and outlining the three-stage program to land an American on the moon.

To meet these objectives, the Committee passed a bill that provided NASA the financial resources and authorization to set up its own research facilities. The legislation became law on August 14, 1958, and NASA moved immediately to establish the Goddard Space Flight Center (GSFC) in Greenbelt, Maryland. GSFC has developed into one of the largest institutions studying our planet, the solar system, and the universe. It also managed the development and operations of unmanned spacecraft and related technologies. With the establishment of the National Oceanic and Atmospheric Administration (NOAA) on October 3, 1970, the Space Flight Center also took charge of monitoring flight tracking, data retrieval, and the development of new satellite technologies.

As an ancillary activity of the Select Committee, Chairman McCormack chose William Natcher and Les Arends to act as a subcommittee to investigate Unidentified Flying Objects (UFO). The topic had become a subject of great public interest and speculation since the beginning of the Atomic Age and the reputed sightings at Roswell, New Mexico, in 1947. Natcher and Arends primarily wanted to know what the Air Force knew about UFOs and their activities relating to UFO sightings. In an effort to minimize attention to a rather standard review of U.S. Air Force files, the Members referred to the meetings as the "Subcommittee on Atmospheric Phenomena." Chairman J. Edward Roush of Indiana, who would serve on the Committee from 1959-1969, was perhaps the most outspoken member of the Committee on UFOs. He wanted to investigate the issue during a seminar on July 29, 1968, which ended without any official action. Although the topic of UFOs had never been a priority or even listed as a jurisdictional issue, the question of extraterrestrial life has been the subject of subcommittee hearings during the 95<sup>th</sup>, 104<sup>th</sup>, and 107<sup>th</sup> Congresses.

While the Select Committee went about its work, the House leadership debated the structure of a permanent committee. Since both the House and Senate wanted to establish similar committees, the

concept of a joint committee was considered over the objections of Speaker Rayburn. Many thought that such a committee would have the advantages of representing the entire Congress and the benefit of input from a larger number of Members and staff. However, some House Members were concerned that any contribution they made in the legislative process would be overshadowed by the Senate. The House and the Select Committee debated the joint committee issue during May and June of 1958, and the consensus shifted from endorsing the idea to supporting the creation of a separate House committee. On July 21, the House considered and unanimously passed the resolution to establish the Committee on Science and Astronautics when the 86<sup>th</sup> Congress convened on January 3, 1959.

The House authorized the Committee to oversee NSF, which Congress had established in 1950. NSF managed a multimillion dollar operation that funded scientific and engineering projects dealing with earth sciences, economics, education, and astronomy. Currently, NSF provides grants in the social sciences, mathematics, and computer studies to colleges and universities that demonstrate the ability to make significant advancements in their field. In 2007, Congress authorized a budget in excess of \$6 billion for NSF, which provided grants to approximately 200,000 researchers.

In 1958, the House also authorized the Committee to have jurisdiction over the Department of Commerce's National Bureau of Standards (NBS). Congress created NBS in 1901, which had the responsibility to establish and maintain standards in weights and measures. NBS also had the duty to employ the highest level of engineering and physical sciences available in its laboratories and to ensure that all products comply with the bureau's standards.

### **The Committee on Science and Astronautics and Chairman Overton Brooks**

On January 3, 1959, the 86<sup>th</sup> Congress convened and selected Brooks as chairman of the Committee on Science and Astronautics. The Committee was comprised of 25 Members, with a larger proportion of Democrats to Republicans than were seated on the Select Committee. During the 85<sup>th</sup> Congress, House Democrats maintained a narrow majority of 234 to 201, and in the Select Committee each party held six seats plus the Democratic Chairman. Democrats gained almost 50 seats in the 1958 elections, increasing their majority in the 86<sup>th</sup> Congress, 283-153. As a result, Democrats on the Committee on Science and Astronautics were allotted 16 seats while the Republicans numbered only nine.

An energetic leader, Chairman Brooks immediately took the initiative seeking to personally direct everything under the Committee's jurisdiction. Brooks had earlier served as a member of the Armed Services Committee, where he clashed with Chairman Carl Vinson over Vinson's restrictive methods that included directly controlling the activities at the subcommittee level. Brooks chafed under Vinson's refusal to delegate authority to other Members on his Committee. Ironically, Brooks ran the Committee on Science and Astronautics in much the same manner. He asserted his power in order to keep a tight rein on NASA's projects and refused to create a permanent set of subcommittees. He also expended considerable effort testing the limits of his Committee's jurisdiction by unsuccessfully pressuring other committees whose areas of jurisdiction seemed to overlap with those of his Committee.

Under Brooks' leadership, the Committee was able to pass several important pieces of legislation. The most significant concerned NASA's annual budget authorization of \$485,300,000, which became public law on June 15, 1959. The Committee established strict rules governing NASA's expenditure of funds to ensure that the agency would progress toward its goal of being the world's leader in space. With this new government focus and financial support, several NASA scientists projected that the agency could safely land a man on the moon within seven to ten years.

The Committee also encouraged additional scientific research under the jurisdiction of NSF. The Committee amended the NSF act by including a provision for the granting of scholarships and graduate fellowships in the fields of math, physics, medicine, engineering and the sciences. The National Defense Education Act of 1958, passed in the wake of *Sputnik*, became a major component of the nation's science policy and provided grants to individuals on a geographic basis and not strictly on academic achievement. The act mandated that NSF create a Science Information Service, which would support information systems, promote publications, and serve as a repository for foreign scientific information. The Committee also called upon NSF and the National Academy of Sciences to create the National Medal of Science, which the president would present to scientists and mathematicians as acknowledgment of their important work in physics, biology, mathematics, and engineering. In 1980, Congress expanded the scope of the award to include the social sciences and behavioral studies.

In 1959 and 1960, Chairman Brooks, with the encouragement and unwavering support of Majority Leader McCormack, assembled a professional staff grounded in the scientific and technical fields. The Committee and NASA also benefited by the transfer in 1960 of all

nonmilitary personnel and projects in DOD's ARPA program to NASA. As a result of these organizational changes and hard work, the Committee and Brooks were able to see the first fruits of their efforts through NASA's Mercury Program. The Mercury Program was America's space effort designed to discover whether manned spaceflight was even possible. On May 5, 1961, astronaut Alan Shepard became America's first man in space onboard *Freedom 7*, which was launched atop von Braun's Redstone rocket. Ten weeks later, astronaut Gus Grissom successfully rode the second American manned suborbital flight into space.

By mid-1961, the Mercury program was well underway, and President John Kennedy used the Shepard flight as the political platform on May 25, 1961, to announce his vision of going to the moon: "I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the moon and returning him safely to the earth." Unfortunately, the Russians presented NASA and the nation with another psychological setback when, on August 7, 1961, they orbited a man 17 times around the Earth. That unhappy turn of events was shortly followed by the untimely death of Chairman Brooks. The Chairman had suffered from ill health, and overwork led to a fatal heart attack on September 16, 1961.

#### **New Leadership and the Race to the Moon**

George Miller of California became chairman of the Committee on September 21, 1961, and served until 1973. Chairman Miller had a background in civil engineering and, like his predecessor, had served on the Armed Services Committee under Chairman Vinson. With NASA's expanding budget, which was approximately \$1 billion in 1961 and would increase another five or six times in four years, Miller wanted to ensure the best use of public funds. Miller charted a new course for the Committee by establishing permanent subcommittees, much to the delight of senior Democrats who would now be able to chair their own subcommittees. The subcommittees included: Manned Space Flight chaired by Olin Teague; Advanced Research and Technology chaired by Victor Anfuso; Space Science chaired by Joseph Karth of Minnesota; Applications and Tracking and Data Acquisition chaired by Ken Hechler; Patents and Scientific Inventions chaired by Emilio Daddario; and Women as Astronauts also chaired by Victor Anfuso.

With a lengthening list of programs and timetables, NASA experienced organizational and planning problems in the early 1960s that delayed the first orbital flight. The Committee, in its oversight

role, confronted NASA concerning its launch vehicle Nova. The second-stage rocket program was ill-defined, massive in its scope, and well beyond its projected cost. The Manned Space Flight Subcommittee chaired by “Tiger” Teague of Texas refrained from dictating policy to NASA, but by the spring of 1962, he led his subcommittee in voting to cut \$72 million from the authorization bill for construction of the Nova facilities at Cape Canaveral and in Mississippi. This move sent a clear message to the agency that they should establish more clearly defined goals.

Chairman Karth of Minnesota on the Space Science Subcommittee faced a similar problem. After successfully helping NASA deal with its relationship with private contractors, the agency drew a less than positive response from Karth’s subcommittee for its Centaur rocket program, whose purpose was to launch unmanned satellites to explore the moon. Through the subcommittee’s oversight role, the agency transferred the project out of von Braun’s department in Huntsville, Alabama, and moved it to the Lewis Research Center in Cleveland, Ohio. Von Braun’s group of scientists had been focusing their efforts in developing the liquid-fueled Saturn V rocket and did not have the ready expertise then available at the Lewis Center to deal with a hydrogen-fueled engine.

Despite several problems attributable to unprecedented growth in such a short period of time, NASA succeeded in achieving one of its primary goals in early 1962. Although delayed by several months, astronaut John Glenn piloted *Friendship 7* around the Earth three times on February 20, 1962. Glenn’s flight would be followed by three more successful Mercury missions with the final flight lasting 24 hours.

In the midst of the Mercury program, the Committee passed a piece of legislation that provided NASA with an important degree of independence from the Government Services Administration (GSA). After Chairman Teague led his subcommittee in a successful fight to stop the Air Force from taking control of some of the facilities at Cape Canaveral, the Committee helped pass a bill that removed GSA from setting standards for NASA facilities. The legislation allowed NASA to develop a set of its own specialized building guidelines and standards for its facilities instead of allowing GSA officials to oversee projects that were outside their expertise.

With the Committee’s oversight role and guidance, NASA completed the Mercury program in 1963 and began the two-man Gemini program, which was followed by the three-man Apollo project. The agency proved through the Mercury flights that man could survive in space. NASA’s Gemini program provided astronauts and ground personnel the opportunity to experiment with docking procedures



between two space vehicles, study the effects on man of long space flights, and test if man could venture outside of his spacecraft. Astronaut Edward White achieved fame on June 3, 1965, with the first space “walk” by an American.

Once NASA finished with the two-man Gemini program in November 1966, it commenced work on Apollo, which was projected to take a three-man crew on a mission to the moon. Unfortunately, on January 7, 1967, a fire in the Apollo 1 capsule killed White and the other two members of the crew, Gus Grissom and Roger Chaffee. Several days after the fire, Chairman Miller asked Chairman Teague to conduct a series of oversight hearings that would follow the presidential investigation to determine the extent of the problem while ensuring that the Apollo program not be needlessly delayed or derailed by Members who opposed manned space flight. Prior to the accident Chairman Teague had met privately with the astronauts and received their assurances that they were fully aware of the potential risks and felt confident in NASA’s safety procedures. The technical aspect of the investigation determined that a fault in the wiring had caused a spark which ignited the oxygen-rich atmosphere inside the capsule. As a result of the Teague hearings, the Committee’s NASA Authorization Act, 1968, called for the establishment of an Aerospace Safety Advisory Panel. The entire process was completed during the summer of 1968, and NASA was able to quickly put in place a new and effective set of safety procedures.

NASA’s new guidelines helped the agency achieve a great milestone on December 21, 1968, with the launch of Apollo 8 on top of von Braun’s brand new Saturn V rocket. The event captured the imagination of the country as man ventured for the first time to another celestial body. On a Christmas Eve television broadcast, astronauts Frank Borman, James Lovell, and William Anders had one of the largest audiences in history as they read from the book of *Genesis* while transmitting images of the Earth from lunar orbit. Seven months later NASA fulfilled President Kennedy’s call to land a man on the moon. On July 20, 1969, Apollo 11 astronauts Neil Armstrong and Buzz Aldrin landed in the Sea of Tranquility while Michael Collins orbited above the surface until their return.

Even in the light of so many successes, the public soon lost interest in NASA’s moon program until a near catastrophic systems failure aboard Apollo 13 on its outward voyage to the moon in April 1970. The hour by hour suspense captured the attention of the entire world until they landed safely in the Pacific Ocean near American Samoa. On December 19, 1972, the Apollo moon program ended with the return of Apollo 17. By the conclusion of the Apollo program, NASA had

launched nine missions to the moon carrying 27 astronauts, and of those individuals, only 12 had set foot on the surface of our nearest celestial neighbor.

Although the space program was perhaps the most spectacular achievement of the Committee, the Members also worked on other significant legislation. They rewrote NSF's authorizing legislation as a result of its expanding and increasingly complex mission. Also, as part of its jurisdiction, the Committee worked with NBS to improve fire and safety research and develop standard reference materials.

### **The Benefits of Science Come into Question**

While NASA was receiving huge increases in its budget and achieving spectacular goals in space, more and more Americans began to question the benefit of science, technology, and industry versus the costs to the environment. This new attitude became more pervasive in the mid-1960s and continued well into the 1970s. During the 1940s and 1950s, the symbol of progress had been smoke spewing from factory chimneys and the production of coal and oil to fulfill the nation's energy needs. However, serious questions were being raised by individuals like Rachel Carson, in her book *Silent Spring* (1962), concerning the environmental effects of insecticides, which encompassed the very basic chemical products of science. In 1966 Harry Harrison wrote the science fiction novel *Make Room! Make Room!* set in a waste-filled, overpopulated New York City. In 1973 the book was turned into the movie *Soylent Green*, which repeatedly referred to the environmental problem of the "Green House Effect." Environmental concerns, the oil embargo crisis of 1973, and the belatedly acknowledged fact that Americans in 1966 began using more oil than they produced contributed to the feeling that science could not answer all questions.

In this atmosphere, the Committee had to confront questions concerning plans for the future and pressing environmental and energy issues. Among the general population, citizens lost interest in manned space projects after Apollo 11 and saw no direct benefits to justify the continuation of an expensive program. President Richard Nixon also failed to present any new goals or actively promote the space program after 1969. Spending millions on Apollo 14 to put Alan Shepard on the moon and having him hit a golf ball was seen by some as frivolous. During the first half of the 1970s, NASA deflected some of the critical questions by contributing to US-Soviet détente with its joint 1975 Apollo-Soyuz program. Committee Chairmen Miller and Teague knew the Apollo program would end shortly after the first moon landing, so they began looking ahead to NASA's next project.

The effort to place a man on the moon began in the late 1950s and utilized large multi-stage rockets to lift a payload into Earth orbit, which proved to be expensive and wasteful since the hardware could only be used one time. Chairman Teague was committed to manned space flight and envisioned a craft that could repeatedly achieve Earth orbit and return safely. Out of this vision, the shuttle program, officially known as the Space Transportation System, became the nation's successor launch vehicle that would take NASA astronauts into space through the year 2010. However, the introduction of the shuttle program in 1970 exposed a significant rift in the Committee. Ranking Member James Fulton of Pennsylvania joined Chairmen Miller and Teague in supporting the shuttle program, while subcommittee Chairmen Karth and Hechler opposed the project. At the center of the debate was the question of whether manned or unmanned missions were more cost effective and scientifically productive. The president's science advisor, a position President Franklin D. Roosevelt had created in 1939 and Kennedy formalized in 1961 as the Office of Science and Technology, supported increasing NASA's budget to pay for the shuttle and the construction of a space station. In light of the escalating cost of the Vietnam War and budget shortfalls, Karth, Hechler, and their supporters could not justify an increase in resources and took the extraordinary action on the floor of the House of openly contesting the nature and breadth of Chairman Teague's hearings in an attempt to defeat the shuttle program. However, Chairman Miller and Ranking Member Fulton succeeded in winning the debate by defeating Karth's amendment to strip NASA's budget of \$240 million for the shuttle by a tie vote in the House and passed NASA's 1970 authorization bill.

In addition to supervising the space program, the Committee also had to confront the ever increasing complexity of other scientific projects under its jurisdiction, which included a wide area of research and development activities at various national laboratories, NBS, NASC, and NSF. To meet the need to improve interagency communications and better coordinate activities, the Committee proposed the establishment of the Office of Technical Assessment, which Congress created in 1972. This congressional office studied scientific and technical issues at a depth not possible by regular congressional staff and provided reports, studies, and findings to the public and congressional committees. Former Member and subcommittee Chairman Emilio Daddario served as the director until 1977. In 1995 the Republican majority in the House and Senate disbanded the board in a move to reduce waste and duplication.

Because of the expansion of world trade, the Committee studied the feasibility of the United States' adopting the metric system. Chairman George Brown was a strong proponent of the conversion, and on December 23, 1975, the Metric Conversion Act of 1975 became public law. Although the change was voluntary, the legislation created the U.S. Metric Board, which was charged with overseeing the transition to the new system. President Ronald Reagan eliminated the Board by presidential order in 1982 due to public resistance and strong opposition, especially from machinists. Even though the general public rejected the metric system, the American scientific community universally utilized the system in engineering, space projects, and joint international programs.

### **The Emergence of Energy and Environmental Policies**

As a direct result of U.S. support of Israel during the Yom Kippur War in the fall of 1973, the Middle Eastern dominated Organization of Petroleum Exporting Countries (OPEC) imposed an embargo on oil shipments to America, causing a severe gas shortage. This crisis presented a major threat to the economic stability of the nation and new problems for the Committee. Although the Committee faced major technical and managerial hurdles in dealing with NASA and the space program in the 1960s, the interests of all involved had focused on the primary objective of landing a man on the moon. As the energy crisis evolved and Congress attempted to develop a coherent policy, the Committee faced a plethora of technical issues and an incompatible array of special interests pushing their divergent points of view on ways to address the energy issues.

Olin Teague became chairman (1973-1979) of the Committee during the 93<sup>rd</sup> Congress, and, under his leadership, the Committee created a new subcommittee to deal with the energy crisis. Mike McCormack of Washington State became chairman of the Energy Subcommittee, which initiated several important pieces of legislation. Its first bill was the Solar Heating and Cooling Demonstration Act of 1974. The act required the federal government to "initiate, support, and carry out such research, development, demonstrations, and other related activities in solar heating and cooling technologies..." The subcommittee focused the legislation to address means to reduce utility demands, replace fossil fuels with commercially viable solar technology, and protect the environment. The act had a \$50 million budget and called upon NBS, in consultation with the director of NSF, to monitor and report to Congress the results of tests conducted in commercial, educational, and residential applications.

Expanding on this, Chairman McCormack and the subcommittee put forward two additional acts: the Geothermal Energy Research, Development, and Demonstration Act, which was shortly followed by the Solar Energy Research, Development, and Demonstration Act. Included in both pieces of legislation was a provision that no action should adversely affect the environment. These acts became law on September 3, 1974, and came under the authority of the newly created Energy Research Development Administration (ERDA), which would officially begin work in 1975. To oversee the research and development of pilot projects, both laws called for the creation of a committee, which would be directly under the jurisdiction of the Committee on Science and Technology, comprised of several ranking secretaries in the executive branch, an assistant director of NSF, and an associate director of NASA.

Although the Committee was not directly involved in the passage of the Federal Nonnuclear Energy Research and Development Act of 1974, it would become a primary participant in amending the act in later years. One of the longstanding issues that the Committee would confront concerned the first section of the law, which stated that the nation needed to find “environmentally acceptable forms of energy.”

Chairman Teague reorganized the Committee during the 94<sup>th</sup> Congress and created several new subcommittees. The new subcommittee structure included: Energy Research, Development, and Demonstration (Fossil Fuels) chaired by Hechler; Environment and the Atmosphere chaired by Brown; Aviation and Transportation Research and Development chaired by Dale Milford; Domestic and International Scientific Planning and Analysis chaired by Ray Thornton; and Energy Research, Development and Demonstration chaired by McCormack. Only the Space Science and Applications Subcommittee retained its original name, but its composition changed under its new chairman, Don Fuqua, with the Democrats increasing their majority over the four Republicans from five Members to eleven.

Under this new structure, Teague placed a great deal of reliance on two subcommittees in the field of energy legislation. Chairmen Hechler and McCormack worked to pass the ERDA authorization during 1976, and Chairman Brown’s subcommittee added the environmental component to the final bill. As part of the authorization, ERDA assumed responsibility for and management of energy research and development activities along with some military nuclear programs.

Early in the 95<sup>th</sup> Congress in 1977, the House expanded the Committee’s jurisdiction over energy research and development programs to include nuclear power.

One of the most divisive issues that came before the Committee during the late 1970s was the Clinch River Breeder Reactor Program. In the post-war period, scientists and government officials desired to develop a type of reactor which would create more fissionable material than a reactor would consume. Scientists suggested that the building of this new type of fast-neutron nuclear reactor could prove to be one answer to the nation's energy needs. During Teague and Fuqua's chairmanships, a majority of Members on the Committee supported the breeder reactor research program. In late May and early June 1977, Chairman Teague led a group of Members and staff to France to study its national programs and to Austria to meet with the International Atomic Energy Agency. Upon their return, Chairman Walter Flowers of Alabama of the Fossil and Nuclear Energy Research, Development, and Demonstration Subcommittee began holding budget hearings on the Clinch River Breeder Reactor project. President Jimmy Carter in mid-May 1977 declared his intent to cancel the program because of nuclear proliferation concerns.

Chairman Teague, who initially questioned the program, had become a supporter along with Chairman McCormack, Marilyn Lloyd Bouquard (Rep. Marilyn Lloyd) of Tennessee and a majority of the full Committee Democrats. All but one of the committee Republicans also supported Clinch River. Congresswoman Bouquard had the additional impetus to support the project since it would be built in her home district. Chairman McCormack felt so strongly about the reactor program that he even met directly with President Carter, without the knowledge or approval of Chairman Teague. McCormack's effort proved fruitless and only succeeded in creating a major rift between himself and Chairman Teague. Although Teague agreed with McCormack's position on the reactor, Teague's approach to running the Committee precluded other Members from opening a dialogue with the president without the Chairman's knowledge.

The opponents on the Committee included f Richard Ottinger of New York and other antinuclear Democrats who cringed at the prospect of expending more funds for a project they considered flawed and dangerous. Experts such as Edward Teller, father of the H-Bomb, and Admiral Hyman Rickover, father of the nuclear submarine and Jimmy Carter's mentor, generally agreed with their premise that the project was of a poor technical design and presented nuclear proliferation dangers. Chairman Teague repeatedly tried to put forth compromises that would satisfy both groups and not trigger a presidential veto of the ERDA authorization bill of 1977. Following some bitter debates, Teague finally won a temporary victory. The bill's passage proved to be a sharp rebuff of the president's policy, but support remained weak

in later Congresses to continue funding the Clinch River Breeder Reactor.

Besides the major energy authorization bills, subcommittee Chairman McCormack and Ranking Republican Barry Goldwater, Jr., from California worked together on the Electric and Hybrid Vehicle Research, Development, and Demonstration Act of 1976. Battery-powered automobiles had been a dream for many years, and this legislation brought government researchers into the program. The bill made note of the advantages of improving the nation's economic and national security needs, and it also addressed the benefit of cutting down noise levels and reducing pollutants. Although the technology was not advanced enough at the time for commercial applications, research continued.

The Committee also had jurisdiction over fire safety, and Chairman John Davis of Georgia, who headed the Science, Research, and Development Subcommittee, worked on legislation that would reduce the number of deaths by fire in America. As a result of the loss of approximately 250 firefighters and 12,000 citizens through fires in the single year of 1971, Davis put forth the Federal Fire Prevention and Control Act of 1974. This legislation created the United States Fire Administration (USFA) and the National Fire Academy (NFA) in Emmitsburg, Maryland. Since the act's inception, the death toll due to fires has declined by approximately 50 percent.

Chairman Brown proved to be a strong leader of the Environment and the Atmosphere Subcommittee and succeeded in passing several important pieces of environmental legislation. As part of NASA's 1975 authorization bill, the subcommittee included a section entitled Upper Atmospheric Research, which directed the agency to investigate and monitor the chemical and physical composition of the troposphere. The subcommittee also utilized its jurisdictional authority over the National Weather Service (NWS) to work for the passage of the National Weather Modification Policy Act of 1976, which established a program to protect or warn the public concerning weather related events such as hurricanes and tornados.

During the 1970s the Committee worked with NBS to begin to focus on environmental questions relating to offices, factories, and homes. NBS established a number of commercial guidelines dealing with pollution and the conservation of energy. In keeping with other ecological issues, the Committee helped enact the Environmental Research, Development, and Demonstration Authorization Act of 1976. The act provided the authority to the Environmental Protection Agency (EPA) to conduct research into the effectiveness of a wide range of

legislation dealing with clean air and water, waste disposal, noise pollution, and pest control.

The Committee's long held desire to have a cabinet level energy department came to fruition soon after the inauguration of President Carter. During an April 18, 1977, television address to the nation concerning energy, Carter stated: "Our decision about energy will test the character of the American people and the ability of the President and the Congress to govern. This difficult effort will be the 'moral equivalent of war' -- except that we will be uniting our efforts to build and not destroy." Subcommittees under the leadership of Flowers and McCormack worked to pass the Department of Energy Act of 1977, which united ERDA and the Federal Energy Administration to form the main components of the new department. Carter signed the legislation and declared October 1, 1977, as the effective date when the Department of Energy (DOE) would begin operations. The act provided research and development funds, facilities for expanded geothermal study, and electric and hybrid car research. Another important aspect of the act required the new department to investigate the impact of automobiles on energy use and the environment.

The Environment and the Atmosphere Subcommittee under Chairman Brown continued to champion environmental issues and worked for the passage of several important pieces of legislation. One bill of particular interest to Brown was the Earthquake Hazards Reduction Act of 1977. As a resident of California and a witness to the damage done during the 1971 Sylmar Quake in California, along with understanding the effects of other quakes such as the 1964 Good Friday Quake in Alaska and the August 1959 Hebgen Lake Quake in Montana, Chairman Brown crafted legislation to involve NBS, NSF, NASA, NOAA, DOD, and the Department of Housing and Urban Development (HUD) to help deal with the aftermath of any future events. Due to the threat quakes posed to the safety of individuals, the economy, and national security interests, the Committee established the National Earthquake Hazards Reduction Program (NEHRP). NEHRP staff worked under the auspices of NSF, NBS, the Federal Emergency Management Administration (FEMA) and the United States Geological Survey (USGS) and was charged with the responsibility of developing better construction standards, monitoring land use, improving preparedness, and investigating techniques to predict quakes.

By the early 1970s, large scale dumping of waste off the coasts of New York and New England had become a major concern to the citizens in Wydler's New York district in Nassau County on Long Island. This and other environmental concerns occupied a major part of the Environment and the Atmosphere Subcommittee's time during



the 95<sup>th</sup> Congress. With input from Wydler, the full Committee's ranking member, the subcommittee drafted legislation that created the National Ocean Pollution Research and Development and Monitoring Planning Act of 1978. The act established a comprehensive five-year program that called upon NOAA to monitor the environmental impact of dumping waste along the coastline.

In addition to the question of dumping waste into the ocean, Committee members began to focus on the long-term environmental effects of industrialization and gas emissions. The Committee began work in 1976 to examine this emerging issue, which led them to write the National Climate Program Act in 1978. The act was more expansive than the National Ocean Pollution Research and Development and Monitoring Planning Act of 1978's mandate to monitor the situation and produce a report. The Climate Act created a national climate research program under the authority of the Department of the Interior and administered through the Commerce Department designed to give scientists around the world a better understanding and ability to react to natural and manmade climate changes and their implications.

The Committee's view of understanding and protecting the environment extended far beyond the United States to include Antarctica, one of the best places to study long-term environmental issues. Major expeditions during the International Geophysical Year, July 1957–1958, established the first permanent bases since Richard Byrd wintered on the ice shelf in the early 1930s. In the 1970s, Chairman Brown led his subcommittee to write legislation to protect the flora and fauna and prohibit the introduction of any new life forms into Antarctica's ecosystem. Because of the continent's fragile environment, where it would take hundreds or thousands of years for any disruptions in the ecology to correct itself, the Committee also included in the legislation a prohibition against the release of pollutants on the ice or in the surrounding waters. The Antarctica Conservation Act of 1978 gave NSF, NOAA, and other government agencies the power to enforce laws and treaties concerning the continent. To oversee their work, Committee members, such as Tom Harkin of Iowa, Committee staff, and leaders of NSF were part of a long list of visitors who have traveled to and studied Antarctica.

#### **Science Policy under Chairman Don Fuqua**

In 1978 Chairman Teague retired, passing the reins to Don Fuqua of Florida at the beginning of the 96<sup>th</sup> Congress. Soon after Fuqua assumed the chairmanship (1979-1987), the nation was confronted with a revolutionary movement in Iran which precipitated a new energy

crisis. With the return of long lines at the gas pumps, energy concerns reemerged as a top priority in Congress. In addition to the gas crisis, on March 28, 1979, a nuclear accident occurred at Three Mile Island, near the cities of Harrisburg and Hershey, Pennsylvania, which raised questions of safety and the long term viability of nuclear power plants in the U.S. Congressional oversight of the near disaster involved the full Committee and two subcommittees. Members and staff had to wade through a litany of technical and design issues complicated by the fact that every nuclear power plant in the nation was of a different design. In this atmosphere, Members who distrusted fission power renewed their opposition to funding nuclear energy but failed to offer practical alternatives. The majority of the Members, however, worked to help calm the public mood and succeeded in keeping other nuclear facilities from being closed. However, the direct result of the accident was a general aversion to nuclear power and the suspension of building any new facilities.

Chairman Fuqua also had to confront the ongoing controversy over the Clinch River Breeder Reactor. He supported the program and weathered contentious Committee debates and lobbying efforts by major power companies. The main opposition to the Clinch River project predated the Three Mile Island event and centered on the issues of proliferation, the technical feasibility of the plan, and general opposition to nuclear projects. As more and more Members voiced their opposition, the full Committee held its last hearing on the subject, "Closeout Costs-Clinch River Breeder Reactor Project," during the first session of the 97<sup>th</sup> Congress. On October 26, 1983, Congress terminated all funding over the objections of President Reagan.

The Committee held a range of hearings concerning energy issues that eventually made their way into the Energy Security Act, which became law on June 30, 1980. One of the most significant aspects of the legislation concerned the creation of the Synthetic Fuels Corporation. The legislation tasked this public-private corporation to develop methods of deriving energy from hydrogen found in water and from coal, lignite, peat, shale, tar sands, biomass, alcohol, geothermal, solar, wind, and other renewable sources. The legislation also put in place programs designed to conserve energy by giving homeowners and businesses incentives to improve and update heating and cooling systems and install insulation. Shortly after the passage of this bill, oil prices declined precipitously during President Carter's last year in office. In this environment and with the new administration of Ronald Reagan exerting a great amount of influence on the Hill, the executive branch succeeded in abolishing the corporation in 1985.

In conjunction with the work on the Energy Security Act, Chairman Richard Ottinger of the Energy Development and Applications Subcommittee took the lead in developing wind and ocean thermal energy legislation. The subcommittee membership included two future chairmen of the full Committee, Robert Roe of New Jersey and Robert Walker of Pennsylvania, and future Senators Bill Nelson of Florida and Albert Gore, Jr., of Tennessee, who would become vice president in 1993. The energy bills exemplified the widespread and thematic approach the Committee pursued in an attempt to deal with the crisis. Work on the production of electricity from ocean thermal conversion had begun and was soon accelerated to test the program on a larger scale. The wind energy proposal called upon NASA, EPA, and NOAA administrators to supply support and expertise to research the project. NASA's input was deemed crucial because of the work done at the Lewis Research Center on rotors and stators, which comprised the most important part of wind driven devices.

With the Three Mile Island accident still fresh in people's minds, the Committee fought a divisive battle to help pass the Nuclear Waste Policy Act of 1982. The topic of nuclear waste had become a very touchy subject in Congress after it disbanded the Joint Committee on Atomic Energy on August 5, 1977. Congress' dealing with nuclear issues became more fragmented as different committees assumed various aspects of the Joint Committee's jurisdictional duties. Although the Interior and Energy Committees dealt with the bulk of waste policy legislation, the Committee on Science and Technology played an important role in crafting the final bill. Chairwoman Bouquard of Tennessee and Ranking Member Manuel Luján, Jr., of New Mexico, led the Energy Research and Production Subcommittee in a hearing entitled "Nuclear Waste Management Comprehensive Legislation." The result of the hearings was to add their recommendations to H.R. 5016 and DOE's authorization to proceed with analysis and procurement of suitable sites to store nuclear waste. The debate pitted those who saw science as a means to solve the nation's energy problems against those who feared precipitating an environmental crisis. After years of debate concerning the site for a repository, in 1987 DOE selected Yucca Mountain, Nevada. Despite the dangers of currently holding nuclear waste in aboveground containers of dubious quality, the storage issue is still unresolved due to an array of legal challenges emanating at the state, national, and Native American tribal level.

In an effort to more effectively confront another environmental concern during the 97<sup>th</sup> Congress, the Natural Resources, Agriculture Research and Environment Subcommittee, led by Chairman James

Scheuer of New York, held hearings on hazardous waste disposal as part of its oversight of EPA's 1982 budget. Eight years after the creation of EPA in 1970, the agency became deeply involved in the cleanup of the environmental disaster at Love Canal in Niagara Falls, New York. Subcommittee Chairman Scheuer, a resident of New York City, helped craft a set of amendments to the 1980 Comprehensive Environmental Response Compensation and Liability Act, known as the Superfund. The fund enabled EPA to conduct its own research to determine the condition of different sites and the most effective clean-up procedures for removing deadly contaminants found in the ground.

During Fuqua's chairmanship in the 96<sup>th</sup>-99<sup>th</sup> Congresses, the Committee worked to pass several new research and educational pieces of legislation. One of the more important changes enabled NSF to expand its Antarctic research and include the Arctic. The Committee also helped fund DOE research and development projects as well as continuing to support earthquake and fire prevention programs. In the field of education, Fuqua and the Committee, in conjunction with the Education Committee, held hearings and worked to pass the Education for Economic Security Act, which became law on August 11, 1984. The act directed NSF to help develop science and technology curricula for primary and secondary education, which has become known as the Science, Technology, Engineering, and Mathematics Program.

The Committee continued its long support of NASA, focusing in the 1980s on the space shuttle program, the agency's major manned space project, and the shuttle's main mission of ferrying men and material for the construction of the International Space Station. The Committee held almost a dozen hearings between 1981 and 1986 where NASA personnel presented shuttle flight information and the astronauts personally appeared as witnesses. Unfortunately, after five years of success, tragedy struck the shuttle program on January 28, 1986, when the space shuttle *Challenger* suffered a rocket failure. The accident resulted in the loss of all aboard and made news around the world. Especially tragic was the death of Christa McAuliffe, who the House had named as the "First Teacher in Space." The full Committee held two investigations into the disaster and helped NASA identify the technical and administrative problems and oversee the necessary corrective procedures. The Committee also conducted oversight hearings into NASA's much delayed space telescope project, which ultimately led to the successful use of the shuttle to carry the Hubble Space Telescope into Earth orbit in 1990.

During the 97<sup>th</sup> Congress, the Committee helped pass the Small Business Innovation Development Act of 1982, which set aside research funding for small technology businesses. The program

originally had a budget of \$100 million per annum, which has expanded in recent years to approximately \$2 billion. The most far-reaching piece of legislation the Committee enacted during the 99<sup>th</sup> Congress was the passage of the NSF Authorization for 1987, which became law on August 21, 1986. Included in the legislation was a codicil that called for the networking of research computers. The concept of interconnecting computers began in the early 1960s, and DARPA created the Advanced Research Projects Agency Network (ARPAnet) in 1968-1969. This networking of government research laboratories and universities was the foundation for the Internet.

Chairman Gore headed the Investigations and Oversight Subcommittee during the 97<sup>th</sup> and 98<sup>th</sup> Congresses and contributed to the Committee's work on NSF authorization legislation. Gore also conducted several important subcommittee hearings that focused on the development and potential uses of computers. Hearings topics included: "Small, High Technology Firms, Inventors and Innovation;" "Emergency Management Information and Technology;" "Local Incentives for High Technology Firms and Innovation;" and "Computers and Education." As the subcommittee's chairman for four years, Gore conducted a total of 64 hearings that ranged from sodium in food and high blood pressure, forecasting energy demands, synthetic fuels development, genetic screening, carbon dioxide in the climate, diesel technology, robotics, to human genetic screening, and carbon dioxide and the greenhouse effect.

To integrate scientific and technological advancements into the activities of people and businesses, Chairman Fuqua oversaw the passage of a wide range of technology transfer legislation. Subcommittee Chairman Brown held hearings that led to the passage of the Stevenson-Wydler Technology Innovation Act of 1980, which established the legal and administrative framework for cooperation among government labs, universities, and private industry. The legislation created offices in the federal government to promote technology transfer and established laws governing patents and commercial use of government inventions. The provisions in the act were expanded in the 98<sup>th</sup> and 99<sup>th</sup> Congresses to redefine the treatment of intellectual property and create cooperative research and development agreements between government and private labs.

In the 99<sup>th</sup> Congress, Fuqua led the Committee to pass the NBS Authorization for 1986 that included an important new area of responsibility for the bureau. Ranking Member Larry Winn of Kansas had become very interested in the issue of structural integrity of buildings after an elevated walkway in his hometown of Kansas City, Missouri, collapsed. The Hyatt Regency hotel disaster of July 17, 1981,

resulted in the deaths of 114 people and the injury of more than 200. Winn worked with Chairman Gore's Investigations and Oversight Subcommittee to review the reasons for the failure and improve construction standards. With the passage of the authorization, NBS assumed the authority to reexamine its testing procedures and develop new building standards. During the 107<sup>th</sup> Congress, these standards became a critical subject of the Committee's investigation into the collapse of the World Trade Center buildings in New York City on September 11, 2001.

During his last term as chairman, Fuqua initiated 24 hearings to review government science policy. This was the Committee's first comprehensive study of where the nation stood in science since the Committee's inception 28 years earlier. Chairman Fuqua envisioned the project as an examination of what advancements had been achieved since the 1945 Vannevar Bush report *Science—The Endless Frontier* and areas where renewed efforts should be pursued.

The hearings allowed the Members to refocus on the broad agenda of science and technical concerns facing the nation. The ultimate impact of the hearings, however, was limited. Bush's position in the government as the head of NACA and the Office of Scientific Research and Development (OSRD) during the 1940s afforded him the unique position to influence policy in both the executive branch and Congress. Unlike the Bush report, which President Roosevelt initiated, Chairman Fuqua's review was generated within the Committee, and thus its impact did not extend substantially beyond the jurisdiction of the Committee.

#### **The Committee on Science, Space and Technology, 1987-1995**

At the beginning of the new Congress, the House named Robert Roe chairman of the Committee (1987-1991). One of his first decisions was to rename it the Committee on Science, Space, and Technology. Chairman Roe felt it only proper that the name of the Committee reflect the fact that a large percentage of its work focused on NASA and the space program.

Chairman Roe and the Committee promoted the advancement of scientific research by passing the Malcolm Baldrige National Quality Improvement Act of 1987. Named after the late Secretary of Commerce Malcolm Baldrige, a personal friend of President Reagan, the act was an amendment to the Stevenson-Wydler Act and created an award the president would personally present to "American business and other organizations," which practiced "effective quality control in the provision of their goods and services." The Committee placed the authority to oversee the operation of the program under NBS, which

Congress and the executive branch renamed in 1988 as the National Institute of Standards and Technology (NIST).

In another effort to promote scientific advances in the private sector and to secure information systems, the Committee developed two important pieces of legislation. On January 8, 1988, the Computer Security Act of 1987 became law. The Committee supported this bill that called upon NIST, instead of the National Security Agency, to develop a set of standards for the security of civilian computers. Chairman Doug Walgren of Pennsylvania and Ranking Member Luján led their subcommittee, Science, Research, and Technology, in the passage of the Steel and Aluminum Energy Conservation and Technology Competitiveness Act, which became law on November 17, 1988. The Committee pushed for the passage of the act in order to reduce energy use in the nation's metals industries. The act called upon DOE to find energy efficient techniques of producing steel and aluminum because private companies in the Members' home districts were unable to do the research or stay in business unless they could reduce fuel costs.

The final landmark piece of legislation the Committee helped develop in the 100<sup>th</sup> Congress was in the area of providing electricity more cost-effectively through the development of high-temperature superconducting materials. Chairwoman Lloyd of the Energy Research and Development Subcommittee, Chairman Dave McCurdy of the Transportation, Aviation, and Materials Subcommittee, and Chairman Doug Walgren of the Science, Research, and Technology Subcommittee held hearings on the subject of superconductivity. The full Committee also conducted hearings later and helped draft the National Superconductivity and Competitiveness Act. The objective of the legislation, which became law on November 19, 1988, was to engage government laboratories in the search for a superconducting material that could handle high amounts of electricity without significant cooling with almost no loss of energy over long distances. Although no immediate breakthroughs were achieved, subsequent research has led to limited commercial applications.

Beginning with Chairman Roe's second term, the Committee focused much of its work on environmental, safety, energy, and education issues. In conjunction with other House committees, the Committee crafted the Oil Pollution Act of 1990. The legislation required government agencies to research and develop methods that would solve the problems of oil-related accidents in light of the *Exxon Valdez* oil spill in Alaska's Prince William Sound on March 24, 1989. It also sought different methods to intercede and limit damage as well as implement effective cleanup methods when dealing with multiple

types of petroleum products. The Committee continued its work to update the Clean Air Act and supported research dealing with the Water Resources Development Act of 1990. In a renewed emphasis on climate change, Chairman James Scheuer of New York held hearings in the Natural Resources, Agriculture, Research, and Environment Subcommittee concerning global food production and population. These hearings resulted in the passage of two pieces of legislation, the Global Change Research Act of 1990 and Food, Agriculture, Conservation and Trade Act of 1990, which addressed the consequences of climate change on agriculture.

While various subcommittees conducted hearings concerning earthquake preparedness, high-definition television standards, Antarctic environmental issues, and increased highway speed limits, the full Committee worked to pass two important fire safety laws. After years of reports detailing fires started by cigarette smokers, Congress passed the Fire Safe Cigarette Act, which gave NIST the authority not only to review the characteristics of lit cigarettes, but also the habits of smokers themselves. The act led to changes in the composition of cigarettes and how they burn when left unattended, which resulted in cutting the death rate in cigarette-related accidents by half. The second piece of legislation was the Hotel-Motel Fire Safety Act of 1990. As a result of the deaths of 97 people and the injury of 140 others in the DuPont Plaza fire in Puerto Rico, which was set by striking workers in 1986 on New Year's Eve, the Committee crafted the act to protect federal employees from having to stay in any facility that lacked a sprinkler system. The legislation further stated in two codicils that the law was "applicable to all places of public accommodation."

Late in the 101<sup>st</sup> Congress, Chairman Roe led the full Committee into another series of hearings concerning NASA. They wanted to know why scientists only discovered that the Hubble Space Telescope had a flaw in its lens after launch and what they intended to do to correct the problem. The telescope program had been in the planning stages for years, and scientists hoped it would be a major advance by providing a view of the universe free from the distortions of Earth's atmosphere. Although NASA assured the Committee that the problem could be fixed, it left a feeling of unease with many.

On a more positive subject, Chairman Bill Nelson of the Space Science and Applications Subcommittee conducted hearings into President George H. W. Bush's proposed Mars and Lunar programs, and a review of NASA's Voyager Missions. The origins of the Voyager project began when NASA started to focus on planetary exploration in the 1960s. NASA launched the two *Voyager* crafts in 1977, and the spacecrafts continued to transmit data long after passing



the orbit of Pluto. In addition to requesting that NASA update the status of the program, Nelson's subcommittee also conducted hearings concerning the increased interest in commercial space activities and NASA's compliance with the November 15, 1988, Commercial Space Launch Act passed during the preceding Congress.

With the beginning of the 102<sup>nd</sup> Congress in 1991, Chairman Roe left the Committee and became head of the Committee on Public Works and Transportation. George Brown became the new chairman of the Committee on Science, Space, and Technology. Under Brown's leadership during the next two Congresses, the Committee conducted a range of hearings but increasingly focused on government technology transfer to the private sector. He also succeeded in passing three important bills that strengthened the preeminence of the nation in the field of technology. By the 1990s computers had become an important tool for many government operations, and as a result, the Committee helped pass the High-Performance Computing Act of 1991, which became public law on December 9, 1991. The legislation, first introduced by former Committee member Senator Gore and known as the "Gore Bill," called for the government's most advanced computer systems to be organized into an interagency configuration administered by the Office of Science and Technology Policy in the White House. To further integrate and enhance government computer activities, the American Technology Preeminence Act of 1992 made the National Technical Information Service the repository of all federal technological journals and mandated that they be made available to other government agencies and the public.

Included in the same act, the Committee incorporated language that allowed national research laboratories to transfer older computer hardware, operating programs, and software to college and university science departments. As part of the Committee's long-standing interest in the training of new generations of scientists and technicians, Chairman Brown oversaw the passage of the Scientific and Advanced Technology Act of 1992, which put in place for the first time a program designed to improve the curricula and standards of engineering and science instructors in community colleges nationwide in an effort to increase the number of students pursuing degrees in these all important fields.

Because of its interest in transportation issues, the Committee continued its efforts to promote efficient means of moving people and materials. As part of the Energy Policy Act of 1992, Chairman Brown pressed hard to guide the nation's energy policy to include conservation and develop renewable energy sources for motor vehicles. The legislation built upon previous bills to promote the development of

usable electrical storage systems that would lead to commercially viable electric automobiles.

A second and equally important bill was the Intermodal Surface Transportation Efficiency Act of 1991. Committee Chairman Brown and former Chairman Roe led the joint effort to pass the act. In the 102<sup>nd</sup> Congress, Roe became Chairman of the Committee on Public Works and Transportation with Chairman Norman Mineta heading its Surface Transportation Subcommittee. Mineta also had the distinction of serving on the Committee on Science, Space, and Technology's subcommittee on Technology and Competitiveness. Chairman Brown and Chairmen Roe and Mineta crafted a transportation bill for fiscal years 1992-1997 with a \$155 billion budget. The purpose of the bill was: "to develop a National Intermodal Transportation System that is economically efficient, environmentally sound, provides the foundation for the Nation to compete in the global economy and will move people and goods in an energy efficient manner."

Although the title of the act indicated the primacy of container freight, the legislation was the first major modification in transportation planning and policy since the creation of the Interstate Highway System in the 1950s. The act encompassed a full array of transportation issues and incorporated many different elements to improve the national and interstate highway systems, mitigate urban congestion, and replace outdated bridges. It also advanced metropolitan planning, the building of toll roads, promoted highway safety and addressed the problems of alcohol and drugs, promoted air transportation and intermodal freight transport, and supported research projects.

With the beginning of the 103<sup>rd</sup> Congress in January 1993, Chairman Brown made some minor changes in the Committee's procedures. Because of one-party control at both ends of Pennsylvania Avenue, a large portion of congressional legislation passed through the Committee as part of the appropriations process instead of separate bills. Chairman Brown and the Committee held a total of 174 hearings during 1993 and 1994. However, only six separate pieces of legislation were passed instead of the usual 20 or 30 bills passed in each of the two previous Congresses. With the end of the Cold War, a "peace dividend" allowed for the reallocation of resources from defense to civilian projects. The most important Committee work was on the Defense Authorization Acts for 1994 and 1995, which redirected resources to technology transfer projects and enlarged the Manufacturing Extension Partnership (MEP). As part of NIST, MEP provided small manufacturers access to services to promote growth,

improve productivity, and expand capacity in public and private sector enterprises.

Even with an alteration in the legislative process, the Committee continued its work to safeguard the environment and oversee science projects. Chairman Rick Boucher of the Science Subcommittee held hearings on NSF and its work in Antarctica. The condition of the ozone layer over the continent had first come to the attention of researchers in the late 1950s, and scientists had detected a major decline in the ozone beginning in the early 1970s. The subcommittee focused its attention on the government's compliance with the Clean Air Act and the use of chlorofluorocarbons. Other subcommittees continued work on electric vehicles, developing green technology, and monitoring global climate issues. In the space program, the Hubble Space Telescope project was the subject of hearings as were possible threats from asteroids and the oversight of NASA's launch capabilities.

One of the more difficult questions the full Committee faced in the 103<sup>rd</sup> Congress dealt with the funding of two important projects. Since the 1950s, one of the most common themes or objectives in the space program was the construction of a space station. NASA had designed the shuttle to be the primary delivery system of men and material to the station. Competing with NASA for funds was the Super Collider program. A project involving pure scientific research, scientists wanted to use the collider to accelerate particles of matter almost to the speed of light to study the dynamics and structure of matter, space, and time. DOE commenced preliminary work on the \$4.4 billion collider project in the mid-1980s and construction began in Texas in 1988. Chairman Roe co-sponsored the House Superconducting Super Collider Project Authorization Act of 1990, but the Senate had begun to question the program and let it die in committee. By 1993 the cost had ballooned to three times the original estimate.

In light of efforts to reduce the federal budget deficit during the first term of President Bill Clinton, the space station and the collider became targets for cancellation. Both programs had similar budgets, and it quickly became a question of which program would be eliminated. The full Committee held hearings on the collider project, but even with five Members on the Committee from Texas, Congress voted to cancel it in 1993. Part of the reason for the collider's cancellation and growing disagreements in the Committee was political. On the national and state level, the collider became a victim of presidential and gubernatorial infighting between Democratic and Republican administrations. In the Committee an increasingly adversarial relationship developed between Chairman Brown and his Democratic supporters and Ranking Member Robert Walker.

### **Republicans Take Control of the House**

In 1994, for the first time in 40 years, Republicans won a majority in the House with a gain of 54 seats, 230-204-1. As part of its *Contract with America*, Republicans introduced new procedures in the House, imposing a three-term limit for committee chairs, slashing committee staff by one-third, and limiting most committees to only four subcommittees. With the opening of the 104<sup>th</sup> Congress in January 1995, Robert Walker of Pennsylvania became the one-term chairman of the newly renamed Committee on Science.

Although the House expanded the Committee's overall jurisdiction in several minor areas, its primary responsibilities remained unchanged. Chairman Walker began his term by reorganizing his Committee into four subcommittees: Basic Research chaired by Steven Schiff of New Mexico; Energy and Environment chaired by Dana Rohrabacher of California; Space and Aeronautics chaired by F. James Sensenbrenner, Jr., of Wisconsin; and Technology chaired by Constance Morella of Maryland. With the objective of increasing efficiency and reducing the number of hearings, the Chairman shifted the Committee's emphasis from the subcommittee level to the full Committee. In the preceding two Congresses, the Committee had averaged 174 hearings, with approximately 140 of those held at the subcommittee level. Under Chairman Walker, followed by Chairmen Sensenbrenner and Sherwood Boehlert of New York, the Republican majority conducted an average of only 85 hearings per Congress, and of those more than 40 percent were full Committee hearings.

The first full Committee hearing was entitled "Is Today's Science Policy Preparing Us for the Future?" and set forth the basic approach Walker wanted the Committee to follow for the remainder of the 104<sup>th</sup> Congress. Under Chairman Walker's direction, the Committee worked to pass eight bills, many of which were reauthorizations of previous acts. The National Technology Transfer and Advancement Act of 1995 further defined intellectual rights and permitted all participants to obtain licenses for their specific contribution in research and development contracts under the Cooperative Research and Development Agreement. The act updated the Stevenson-Wydler Technology Innovation Act of 1980, which allowed government and non-government partners to share resources, technical information, and intellectual property. The Committee also was involved with the passage of two laws that reworded or updated the government's use of the metric system in procurement and building standards. In the field of energy research, the Committee continued its work on the advancement of hydrogen fuel cells.

Before the end of the second session of the 104<sup>th</sup> Congress, Chairman Walker decided to retire from Congress. In his last year on the Committee, NASA presented him with the Distinguished Service Medal for his leadership in advancing the nation's space effort and its commercialization. This was the first time the agency had extended the honor to a sitting Member of the House. In January 1997, Chairman Walker left Congress to become a lobbyist.

During the 105<sup>th</sup> and 106<sup>th</sup> Congresses, Chairman Sensenbrenner led the Committee, and one of the important bills passed during his first term in 1998 concerned women's issues. Chairwoman Constance Morella of Maryland, who chaired the Technology Subcommittee, championed the legislation that established a Commission on the Advancement of Women and Minorities in Science, Engineering, and Technology. The commission was vested with the authority to study and submit a report to the president, Congress, and the states on the participation of women and minorities in the sciences and ways to increase their numbers. Although the legislation ordered the dissolution of the commission after issuing its report, the topic has been a continuing point of interest at NSF.

Under Sensenbrenner's leadership, the Committee continued its emphasis on space and energy issues. The Space and Aeronautics Subcommittee held extensive hearings on commercialization and one on NASA's future entitled, "What Kind of Space Program Does America Need for the 21<sup>st</sup> Century?" The Committee worked with NASA and other lawmakers to pass the Commercial Space Act of 1998, which called upon the agency to expand its efforts to privatize space technology. In the field of energy, the Committee passed a methane law during the 106<sup>th</sup> Congress concerning the exploration of gas deposits on the ocean floor, but the Energy and Environment Subcommittee held the most important hearings, which involved the effects of fossil fuels on the environment. With the increasing interest in environmental issues and the Committee's jurisdiction in the field, Speaker Newt Gingrich appointed Chairman Sensenbrenner, who opposed international agreements concerning environmental issues, to head the House delegation to the global climate conferences held in Kyoto, Japan, in 1997 and in Buenos Aires, Argentina, in 1998.

In 1999, national priorities temporarily shifted away from energy problems and the space program and toward a looming technical crisis. Information technology had increased dramatically in the preceding decade as computers became part of everyday life, but early computers had limited memory, forcing programmers to make shortcuts. It was unclear how the beginning of the new millennium would affect the world's computer systems. Known as the Y2K problem, many

computer experts worried that the date change from the 20<sup>th</sup> to the 21<sup>st</sup> century would cause massive computer disruptions and possible shut downs. The Technology Subcommittee held several hearings during the 105<sup>th</sup> Congress on how the Y2K problem would affect the Postal Service, satellites and global positioning systems, national security, the Federal Aviation Administration, international travel, state governments, and nuclear power. The full Committee also examined how the Y2K issue would impact space and air travel. While no major computer related problems occurred with the beginning of the new millennium, the hearings helped increase national preparedness through its review of computer operations throughout the federal government.

During Sensenbrenner's last term as chairman of the Committee (1999-2000), he presided over several hearings to investigate the quality of and ways to improve science and mathematics education. He placed particular emphasis on the primary and secondary levels. His first hearing, "Why and How You Should Learn Math and Science," was followed by three hearings that focused on math and science teachers and kindergarten through 12<sup>th</sup> grade curricula.

Chairman Sensenbrenner also oversaw two hearings dealing with minority issues. As a follow-up to Chairwoman Morella's Commission on the Advancement of Women and Minorities in Science, Engineering, and Technology passed into law on October 14, 1998, the Committee conducted a hearing to review the commission's report and ways to increase the representation of minority students, which had been a major theme at a number of the national laboratories including Argonne National Laboratory, outside of Chicago, Illinois. One of the last hearings conducted before Chairman Sensenbrenner and the full Committee during the 106<sup>th</sup> Congress concerned EPA. As the result of civil rights questions, the Committee held the hearing, "Intolerance at EPA-Harming People, Harming Science," to ensure the agency complied with federal laws and continued its scientific mission in an effective manner.

#### **After September 11, 2001: New Priorities for the Committee on Science**

With the beginning of the 107<sup>th</sup> Congress in 2001, Sherwood Boehlert of New York became Chairman and served as the Committee's leader through the end of the 109<sup>th</sup> Congress in 2007. Chairman Boehlert desired to focus the Committee's work on energy, education, and environment; but several important national events changed his agenda. During the first session, the Committee held hearings on science and mathematics education, acid rain, combating the introduction of non-native species to the environment, and climate

change. However, the terrorist attacks on September 11, 2001, required an immediate and comprehensive readjustment of priorities.

Reacting to the collapse of the World Trade Center and operating under its jurisdictional oversight authority of NIST, the Committee worked for the passage of the National Construction Safety Team Act that became law on October 1, 2002. The act directed NIST, through its mandate of “assuring maximum application of the physical and engineering sciences to the development of technology in industry and commerce,” to ascertain the causes of structural failure, review evacuation measures, provide guidance on increasing safety standards, and conduct research into improving building material safety. In addition to the act, the full Committee held two hearings on the collapse of the World Trade Center buildings to determine what was learned from the disaster and the strengths and weaknesses of the response at the federal and state levels.

In the post-9/11 environment, the Committee conducted a number of hearings examining the nation’s vulnerabilities to a terrorist attack. Before the end of 2001, Capitol Hill became the target of an anthrax attack that resulted in hearings once the House office buildings were reopened. In this environment the Committee exercised its jurisdiction to investigate the safety of water systems and the security of America’s computer systems. The protection of the nation’s computers was addressed in the Cyber Security Research and Development Act and called upon the auspices of NSF and NIST to oversee its implementation.

One of the most important laws that passed through the Committee was the Homeland Security Act of 2002, which was enacted on November 25, 2002. In early June, Chairman Vernon Ehlers of Michigan conducted hearings in his Environment, Technology, and Standards Subcommittee on the homeland security issue. Chairman Boehlert held a hearing two weeks later to examine the possibilities of creating a new federal bureau. The Committee’s main responsibility set forth in the 2,147-page act called for it to oversee research and development processes and establish a set of standards for the new agency. After passage of the act, the last meeting of the full Committee during the 107<sup>th</sup> Congress examined, “Conducting Research during the War on Terrorism: Balancing Openness and Security,” which proved to be a timely and ongoing question.

As part of the Committee’s jurisdiction of overseeing “standards,” the Members became involved in the balloting problems surrounding the 2000 presidential election. In the aftermath of the Florida election and its many recounts, the Committee conducted hearings beginning on May 22, 2001, with “Improving Voting Technologies: The Role of

Standards.” As a result of the hearings, on October 31, 2001, the Committee approved and sent to the House, the Voting Technology Standards Act of 2001, which failed to pass. However, elements of the Committee’s proposed act were incorporated into the Help America Vote Act of 2002, which became law on October 29, 2002. The Committee’s main responsibility under the act concerned oversight of NIST’s work to ensure the establishment of a set of election standards and eliminate the infamous punch card ballots. Even though the act was designed to solve future election issues, more questions were raised with each change, which led the Committee during the 109<sup>th</sup> Congress to hold a hearing entitled, “Voting Machines: Will the New Standards and Guidelines Help Prevent Future Problems?”

During Boehlert’s last two terms as chairman, the Committee worked on improving education and the expansion of the Malcolm Baldrige Quality Award to include non-profit organizations. The promise of hydrogen fuel in the nation’s future continued to be a topic of Committee hearings as did the desire to secure America’s energy independence. Chairman Boehlert also took particular interest in NSF’s work in the development of nanotechnology and conducted a series of four full and subcommittee hearings on its scientific potential as well as expressing concerns about its environmental and safety implications.

NASA and the crisis caused by the space shuttle *Columbia*’s disintegration upon reentry on February 1, 2003, forced the Committee to face a new set of problems. In its oversight role, the full Committee conducted several hearings into the tragedy and NASA’s response to the accident. Subsequent hearings during the following three years sought answers concerning NASA’s future and the projected termination of the shuttle program by the end of 2010, its financial management, manned space flight in general, and President George W. Bush’s call for a return to the moon and an expedition to Mars. In addition, the Committee worked to develop the Commercial Space Launch Amendment Act of 2004, which placed all business-related space ventures under the control of the Department of Transportation and required the Department to ensure the implementation of safe programs for humans traveling into space.

As a result of the tragedy surrounding the tsunami that occurred in the Indian Ocean on December 26, 2004, Chairman Boehlert called for a hearing as soon as the 109<sup>th</sup> Congress convened. The Committee had a direct and jurisdictional interest in the disaster through their oversight of the National Weather Service (NWS) and NOAA. The primary question concerned America’s preparedness in light of its vulnerable coastlines. The Committee helped craft legislation that called upon



NOAA to establish and operate a tsunami detection system, including in the Indian Ocean, which would provide timely warnings to populations along ocean coastlines.

### **New Directions in the 110<sup>th</sup> Congress**

In November 2006, the Democratic Party captured the majority of seats in the House. Party leaders designated Bart Gordon of Tennessee the Chairman of the newly renamed Committee on Science and Technology. Chairman Gordon, who had succeeded to Gore's seat in 1984, promptly set to work on many of the same issues that faced his predecessors. One of the first pieces of legislation that worked its way through the Committee, the Energy Independence and Security Act of 2007, was a collection of various provisions relating to conservation, renewable marine and geothermal energy research and development, solar energy, and biofuels. The Committee also played an important role in the passage of the Methamphetamine Remediation Research Act of 2007, an area of interest in the previous Congress, which tasked EPA to develop new detection technologies and oversee the cleanup of contaminated sites.

Chairman Gordon's most significant piece of legislation during the first session of the 110<sup>th</sup> Congress was the passage of the America COMPETES Act (The America Creating Opportunities to Meaningfully Promote Excellence in Technology, Education, and Science Act). Chairman Gordon stated for the Committee the overriding importance of the legislation: "This bill will strengthen long-term basic research in the physical sciences, mathematical sciences, and engineering. It directs funding toward graduate students and early career researchers in these areas. It also establishes a Presidential Innovation Award to stimulate scientific and engineering advances in the national interest. Investing in science education and research along these lines is necessary if the U.S. is to maintain its position as a global leader in technology and innovation." The various components of the act are based on the recommendations of the Council on Competitiveness, a nonpartisan, nongovernmental group of CEOs, university and labor leaders, and the National Academy of Sciences report, *Rising above the Gathering Storm*. This report, compiled under the leadership of Norman Augustine, former Chairman and CEO of Lockheed Martin Corporation, examined the question of the nation's ability to compete in the 21<sup>st</sup> century. The act encompassed work on promoting innovations and funding a full range of research projects for NASA, NOAA, and NIST.

One of the main facets of the act focused on the continuing energy problem and called upon DOE to create an organization modeled after

DOD's DARPA program, which had originally been designated as ARPA in 1958. The COMPETES Act mandated that the new office in DOE, ARPA-E, reduce the nation's dependence on foreign energy in the next decade while constructively dealing with the issue of global climate change. ARPA-E was structured to enhance results through its semi-independent relationship with DOE and its ability to provide funds to laboratories making progress while being able to eliminate funding for laboratories that failed to show meaningful results.

The act also increased the financial support of NSF during the next several years and established a number of new long and short term educational programs at the state and local levels. The legislation was designed to ensure America's scientific and technological preeminence and encompassed a full spectrum of science and technology issues facing the nation's research labs and its entire educational system.

### **Toward the Endless Frontier**

Looking toward the future, the Committee still must confront many of the central issues that were present in the wake of the launch of *Sputnik* in 1957. It was obvious to America's leaders 50 years ago that maintaining our scientific and technical leadership in the world required a robust educational system. The Committee has supported that effort through the years and the America COMPETES Act is only the latest example of that dedication. As a result of the Committee's work during the space race with the Soviets, its Members and the world have witnessed the successful landing of men on the moon. In the future, the Committee will work with NASA's long term objectives of returning to the moon and eventually going to Mars. The Committee began in the 1970s to confront environmental issues. In 1968, Apollo 8 astronauts gave us a unique and unforgettable view of our environmentally fragile planet set against the backdrop of the limitless universe. That image brought into focus the need to protect our environment, one of the most important challenges facing America and the world.