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Chapter Three

The NASA-Industry-University Nexus: A Critical Alliance in the Development of Space Exploration

by W. Henry Lambright

The National Aeronautics and Space Administration (NASA) is and always has been more than a simple, conventional government organization. When NASA Administrator James E. Webb spoke in 1966 about the organization he headed, he referred proudly to an enterprise involving some 420,000 men and women involved in the single-minded purpose of leading the United States into space. At the time, however, less than 10 percent (34,000) of those employees were civil servants. NASA extended its reach through contracts and grants to numerous external organizations, chiefly industry and universities. The government-industry-university team constituted a powerful institutional partnership throughout NASA's history.¹

The 1960s—the Apollo years—were the time when this partnership reached its peak in terms of scale.² It was also the period during which NASA established or refined most of its innovative management practices. Since then, NASA has consolidated and built further on the foundation it created for itself; few fundamental changes were made in the character of the relations between NASA and its nongovernment partners during the 1970s and 1980s, even as the partners attempted to adjust to diminished budgets and a lower national priority for space. As an agency, NASA still represents one of the more effective government-industry-university systems in existence. This essay focuses on how this system came into being after Sputnik I, was expanded, was pushed to its limit during the 1960s, and was altered in the post-Apollo era of spaceflight since the decade of the 1960s. Most of NASA's interactions with industry and academia since Apollo have been an extension of the approaches put in place during that earlier time.

Origins: The Glennan Era, 1958-1961

Because NASA was formed from existing components based elsewhere within the U.S. government, especially from among the various components of the defense organization, it inherited a strong "in-house" tradition of technical expertise (referring to the idea that

1. For biographical information on James E. Webb, especially as it relates to his management philosophy for large-scale technological systems, see W. Henry Lambright, *Powering Apollo: James E. Webb of NASA* (Baltimore, MD: Johns Hopkins University Press, 1995). For a condensed analysis of Webb's leadership in this effort, see W. Henry Lambright, "James E. Webb: A Dominant Force in 20th Century Public Administration," *Public Administration Review* 53 (March/April 1993): 95-99; W. Henry Lambright, "Past and Present in Powering Big Technology," *Space Times: Magazine of the American Astronautical Society* 34 (November-December 1995): 11-13.

2. For a critique of this administrative approach from one who sees in it too great an aggregation of power, see the Pulitzer Prize-winning book by Walter A. McDougall, . . . *The Heavens and the Earth: A Political History of the Space Age* (New York: Basic Books, 1985).

most engineering and even some production work would be performed by a government entity rather than an industry or university contractor). An emphasis on "in-house" technological skill had been bequeathed from various weapons laboratories, becoming known collectively as the "arsenal system." Clearly, Wernher von Braun's Army Ballistic Missile Agency team at the Redstone Arsenal in Huntsville, Alabama, was an organization firmly rooted in this culture of in-house capability. In addition, such government organizations as the nonmilitary National Advisory Committee for Aeronautics (NACA), first established in 1915 as a means of improving the quality of airplanes in the United States to help offset foreign competition in the commercial market, developed strong "in-house" technical expertise in aeronautical research and development.³

The first NASA Administrator, T. Keith Glennan, on leave from his position as president of the Case Institute of Technology, appreciated the legacy of "in-house" engineering capability that the organizational components incorporated into NASA had developed, but it did not mesh well with the mission of the new agency as he understood it. Accordingly, he determined that most of NASA's work would be performed externally by industry. This was required in part by the need to "scale up" rapidly for Project Mercury, NASA's first human spaceflight program, but it was also a matter of ideology. As he wrote in his diary:

*... having the conviction that our government operations were growing too large, I determined to avoid excessive additions to the federal payroll. Since our organizational structure was to be erected on the NACA staff, and their operation had been conducted almost wholly "in-house," I knew I would face demands on the part of our technical staff to add to in-house capacity. . . . But I was convinced that the major portion of our funds must be spent with industry, education, and other institutions.*⁴

Glennan, as an Eisenhower Republican, believed that government's role should be kept small and that the federal government should rely on private enterprise for getting the public's work done whenever possible.⁵

To a very real extent, Glennan was both an Eisenhower Republican with a fiscally conservative inclination and an aggressive businessman with a keen sense of public duty. He also possessed a strong opposition to government intrusion into the lives of Americans. But he was also an administrator and an educator with a rich appreciation for the role of science and technology in an international setting.⁶ As historian Roger D. Launius has written of Glennan:

3. This legacy of "in-house" engineering capability has been explored in detail in Howard E. McCurdy, *Inside NASA: High Technological and Organizational Change in the U.S. Space Program* (Baltimore, MD: Johns Hopkins University Press, 1993), pp. 34-50.

4. T. Keith Glennan, *The Birth of NASA: The Diary of T. Keith Glennan*, J.D. Hunley, ed. (Washington, DC: NASA SP-4105, 1993), p. 5.

5. Robert L. Rosholt, *An Administrative History of NASA, 1958-1963* (Washington, DC: NASA SP-4101, 1966), pp. iii-vii.

6. These themes are well developed in Glennan's diary, *The Birth of NASA*. See also "Glennan Announces First Details of the New Space Agency Organization," October 5, 1958, NASA Historical Reference Collection, NASA History Office, NASA Headquarters, Washington, DC; James R. Killian, Jr., *Sputnik, Scientists, and Eisenhower: A Memoir of the First Special Assistant to the President for Science and Technology* (Cambridge, MA: MIT Press, 1977), pp. 141-144; James R. Killian, Jr., Oral History, July 23, 1974, NASA Historical Reference Collection. Eisenhower's concerns about this aspect of modern America are revealed in "Farewell Radio and Television Address to the American People," January 17, 1961, *Papers of the President, Dwight D. Eisenhower 1960-61* (Washington, DC: U.S. Government Printing Office, 1961), pp. 1035-40.

While he was an ardent cold warrior and understood very well the importance of the space program as an instrument of international prestige, Glennan emphasized long-range goals that would yield genuine scientific and technological results. Second, he believed that the new space agency should remain relatively small, and that much of its work would of necessity be done under contract to private industry and educational institutions. This was in line with his concerns about the growing size and power of the federal government. Third, when it grew, as he knew it would, Glennan tried to direct it in an orderly manner. Along those lines, he tenaciously worked for the incorporation of the non-military space efforts being carried out in several other federal agencies—especially in the Department of Defense—into NASA so that the space program could be brought together into a meaningful whole.⁷

Glennan fostered the replication of his values and perspectives in NASA as he began to direct its affairs in the fall of 1958, and by the time of his departure from Washington in January 1961, they had been placed on the road to adoption.

Little attention was given to universities, *per se*, during the Glennan era. There was interest in nurturing space science and research projects sponsored at universities, but Glennan did not develop a master plan for the incorporation of a partnership with universities. What he did establish in 1958 was a University Research Program Office at NASA Headquarters under the direction of the Office of Aeronautical and Space Research. This organization, at the behest of the technical program offices, oversaw a small “research by contract” program. [III-1]

In May 1960, Glennan reorganized this structure and created the Office of Research Grants and Contracts as an administrative unit of NASA to coordinate research conducted by nonprofit institutions. This effectively made the new organization the liaison between NASA and most universities, acting on behalf of program offices for work performed outside the agency. All such research activities, therefore, were approved by NASA Headquarters, even though the agency’s field centers might still manage the actual work once it was put into place by the Office of Research Grants and Contracts.⁸

The Department of Defense Framework

Also during the Glennan period, the basic structure of NASA-industry relations was established. The National Aeronautics and Space Act of 1958, which laid out the legal groundwork for NASA’s creation, anticipated that the agency would contract with industry for much of its activities.⁹ In a significant policy action, it extended to NASA the procurement authority contained in the Armed Services Procurement Act of 1947 (ASPA). The importance of this legislation was that it recognized that NASA would be establishing a partnership with many of the same companies with which the Department of Defense (DOD) already had long-standing relations.

The ASPA provisions, which had been amended frequently over the preceding decade, provided the government with the flexibility to address work based on research and development (R&D). ASPA allowed the federal government to divert from the traditional practices of advertising for competitive bids and awarding contracts to the lowest responsible bidder. Instead, the government could use negotiation, a technique developed largely in World War II to meet the war crisis and institutionalized subsequently by DOD.

7. Roger D. Launius, “Introduction,” in Glennan, *The Birth of NASA*, p. xxii.

8. Rosholt, *Administrative History of NASA*, pp. 128-29.

9. This act is available as Document II-17 in John M. Logsdon, gen. ed., with Linda J. Lear, Jannelle Warren-Findley, Ray A. Williamson, and Dwayne A. Day, *Exploring the Unknown: Selected Documents in the History of the U.S. Civil Space Program, Volume I: Organizing for Exploration* (Washington, DC: NASA SP-4407, 1995), 1: 334-45.

On October 30, 1958, Glennan underlined NASA's intent to extend ASPA and DOD practices into its jurisdiction. He announced that NASA's procurement and contracting regulations "would conform in every practicable way" to ASPA. Defense contractors would not have to learn how to work under new rules.¹⁰ This was important for many reasons, including the fact that much of what NASA was doing in its initial years was work DOD had pioneered and then transferred to NASA. With the work came the defense contractors. As a principle of his policy, Glennan maintained continuity between the defense realm and NASA's civilian realm as much as possible, and this continuity increased NASA's contracting options.

Glennan also helped smooth relations with DOD and industry by hiring many former DOD officials to work specifically on NASA-industry relations. In January 1959, he appointed Ernest Brackett, a DOD procurement specialist, to head NASA's Procurement Division. John Johnson, Glennan's General Counsel appointee, also came from DOD. These men brought others to NASA, many of whom had learned government-industry relations in the DOD setting.¹¹

Once its staffing was well under way, NASA began holding conferences with industry to discuss NASA hardware needs and the legal/administrative relations governing procurement. [III-2] NASA stressed that (1) it expected most of its work to be performed by industry and (2) it intended to make it easy for industry to work with the agency by maintaining a principle of continuity between DOD and NASA contracting procedures.

The Patent Problem

One problem in NASA-industry relations in the Glennan era loomed very large: the question of how to ascertain and assign the rights to patented inventions. In the Space Act, there is a lengthy provision (section 305) requiring that inventions (and their patents) made in performance of contracts for NASA become the property of the U.S. government, unless waived (in which case the government retained a royalty-free license for the use of the invention). The responsibility of waiving U.S. rights to an invention was retained by the NASA Administrator, assisted by the Invention and Contributions Board (a body established by the Administrator). Waivers were to be made only in the public interest.

This statutory policy was similar to the statutory policy guiding the Atomic Energy Commission (AEC), but it was very different from the policy that DOD had promulgated administratively. DOD, the nation's largest buyer of R&D and the agency with an industrial clientele similar to NASA's, followed a more liberal policy from the contractor's point of view. The invention remained the property of the contractor, with the provision that the government would have a royalty-free license for the invention's use. In other words, NASA would have to invoke the waiver procedure to grant the same privileges to a contractor that DOD could grant outright in the contract itself.¹²

Glennan was stymied in regard to his "continuity" policy, at least in this area. The patent issue mattered in two ways. First, there might well be *tangible* stakes involved. Significant inventions might derive from working for NASA, and industry could therefore make additional money from marketing them in other contexts. For the federal government, these financial stakes did not exist, because the government itself did not commercialize inventions. However, at a second, *symbolic* level, there were two political issues:

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10. Rosholt, *Administrative History of NASA*, p. 62.
 11. *Ibid.*, pp. 62-63; Glennan, *Birth of NASA*, pp. 108, 120.
 12. Rosholt, *Administrative History of NASA*, p. 92.

whether the federal government might end up “paying twice” for its work and whether the government was “giving away” the public’s property rights to an invention.

These symbolic concerns were intensely expressed by certain legislators with a populist bent. As government expanded its R&D work beyond DOD, they made it a point to push their “title policy” (the AEC model) into other fields. In atomic energy, which began as a government-created monopoly, industry did not have the opportunity to fight for the license policy (the DOD approach). In the case of NASA, industry did fight—but only after the National Aeronautics and Space Act had been passed.

What the patent issue also illuminated was the degree to which terms such as “procurement” and even the broader concept of “acquisitions policy” masked a dynamic institutional relationship between “buyers” and “sellers.” The federal government is a buyer, but the buyer does not always hold all the bargaining advantages. In the pre-Apollo days, NASA was distinctly at a disadvantage—or so it perceived itself—vis-à-vis DOD in acquisition of the best contractors. Many firms quietly spread the word that “NASA would take your patents.” They also pointed out that NASA was an R&D agency and would not provide the lucrative production runs industry could get through DOD. Moreover, the leaders of NASA, such as Glennan and the DOD transplants, did not want an AEC type of policy. They wanted continuity with DOD and an equal chance to get the best and most enthusiastic contractors—the contractor companies that would allow their most creative (and inventive) people to work on NASA contracts.

Although it is all but forgotten today, this matter of patent policy was a significant political issue in the Glennan era. NASA was trying to initiate a close relationship with industry; it was a rival of DOD for many space missions, and by no means an advantaged rival. The patent issue grated on these relations. Glennan felt that the section 305 legislation tied his hands, and the result was his decision to get the legislation amended. Legislators favoring the title policy took a stand, and a legislative struggle ensued. [III-3] This created a controversial backdrop to the more staid NASA-industry relations in other areas during 1959 and 1960. NASA fought for an amendment throughout the Glennan period and was finally able to get legislation through the House of Representatives that would shift the law from title-oriented policy to license-oriented policy. This legislation failed in the Senate, however, where such powerful and populist Democratic senators as Clinton Anderson of New Mexico, Estes Kefauver of Tennessee, and Russell Long of Louisiana favored the title approach.

Other Early NASA-Industry Developments

Having decided that most of its work would be done with industry, and using DOD practices as much as possible, the next question for NASA was how to award major contracts. Glennan concluded that he should be the decision maker for large contracts. In October 1959, NASA promulgated a formal procedure for selecting the recipients of very large NASA contracts. The procedure provided that the NASA Administrator would select all contractors when the intended contract exceeded \$1 million. Glennan indicated that the Administrator would be advised on these decisions by ad hoc source selection boards, primarily composed of technical specialists.¹³

For instance, Glennan’s personal diary discussed the dilemmas involved in the bidding and selection process. In one particularly poignant section, he described the process leading to his selection of Rocketdyne to build the J-2 engine, which powered both the Saturn 1B first stage and the Saturn V second stage:

13. *Ibid.*

At 9:00 o'clock the Source Evaluation Board on the 200 K engine reported. This is a stinker, in the vernacular—five companies bid and three of them are very close together at the top. In fact, they are so close in the technical evaluation that it is almost impossible to choose between them. The same is essentially true in the business evaluation except that one of them bid \$138 million, a second bid \$69 million, the third bid \$44 million. These bids are really estimates of the total cost of the project since this research and development work is always handled on a cost plus a fixed fee basis. The costs do give an indication of the extent of experience of a company in undertaking a difficult task of this sort. For instance, one of the companies which was not in the running bid only \$24 million dollars. While the highest one is undoubtedly high, the lowest indicates a complete lack of understanding of the difficulty of the job.

I took the reports and will now have to sit down with myself in an attempt to find a proper answer to this question.

Later he met with his chief advisers, and they agreed that Rocketdyne would receive the contract. This process was ticklish at best. As Glennan concluded: "It is a fact that if 10 people bid, 9 of them are going to be unhappy because only 1 can win. With the 9 having representatives in Congress, it is almost inevitable that some charges of favoritism, lack of objectivity, etc., will be tossed our way."¹⁴

Throughout 1959 and 1960, Glennan had various management consultants take a look at the agency's administrative issues, including NASA-industry relations. The general thrust of these reports confirmed Glennan's view that as much of NASA's work as possible should be contracted out. [III-4, III-5] However, the reports also pointed out the need for balancing the external work with internal competence. NASA's centers pressed on Glennan their need to grow and build competence. By the end of the Glennan years, 85 percent of NASA's \$1 billion budget was going to industry. But the agency was also expanding its in-house work and capabilities.

Under Glennan in the 1958-1960 period, NASA established a strong relationship with industry based on the principle of continuity with DOD contracting practices. As a Republican, Glennan's conservative values helped create a sense of partnership critical to jumpstarting NASA-industry relations. The "closeness" with industry bothered some critics, including NASA civil servants who wanted more work to be performed in-house. This was particularly true of those who had come to NASA from NACA and the Army Ballistic Missile Agency. The patent issue was also left unsettled. All in all, however, Glennan left a solid foundation on which the next Administrator of NASA could build.

The Webb Era, 1961-1968

Under James E. Webb, NASA Administrator from 1961 to 1968, the NASA-industry-university relationship expanded tremendously. Webb continued the basic philosophy of Glennan—to contract out most of the agency's work to industry—but he surpassed Glennan by consciously seeking innovation in these relations. Both continuity *and* change were objects of NASA policy. Whereas only modest efforts had been made on the academic front under Glennan, Webb established a "university program" that went beyond, in its goals, anything seen in government before—or since. Glennan was rather cautious in his approach to external institutions. Webb used government with an eye toward reform. Glennan was a *technical* engineer. Webb—a lawyer-administrator with exceptional political skills—had the instincts of a *social* engineer. When he took the oath of office, Webb stated that "my purpose would be to work toward creating an environment within which

14. Glennan, *Birth of NASA*, p. 137.

NASA could be as innovative in the management of its programs as it was in aeronautics and space science.”¹⁵ [III-6]

When first asked by the White House whether he would accept a nomination as NASA Administrator, Webb made it clear that he wanted to inherit the two principal NASA officials from the Eisenhower administration: Deputy Administrator Hugh L. Dryden, who was a physicist and former NACA chief, and Associate Administrator Robert C. Seamans, Jr., who was also known as the “General Manager.” Webb wanted to make the major decisions in conjunction with these two men, and together they would form a “triad” for the administrative leadership of the agency.

The May 1961 decision to go to the Moon—just three months after Webb took office—had tremendous impacts on NASA in many ways. The question facing Webb, Dryden, and Seamans after the Apollo decision was how well Glennan’s contracting system would serve to organize the lunar landing program. In general, they accepted that system, even strengthening the procedures instituted by Glennan. The principle of contracting out for R&D was reaffirmed, and the role of in-house staff in technical direction was stressed. Headquarters officials took it upon themselves to make procurement policy more uniform, yet flexible enough for NASA to obtain space hardware whose main features could not be specified in advance.¹⁶

Given Webb’s orientation, there would have been changes in the way NASA dealt with universities and industry even without Kennedy’s decision to go to the Moon. However, what that decision did was enlarge the scope of NASA’s effort and give it a new urgency and many more resources.¹⁷ Also, problems that were important for Glennan were less significant under the impetus of Apollo. For example, the patent issue was one problem Glennan felt had to be resolved with new legislation. Webb decided that he could handle the problem administratively, using the waiver clause. In effect, Webb used an administrative strategy to bring NASA patent policy in line with DOD policy. This infuriated title policy advocates, but Webb pushed ahead and absorbed intense (sometimes very personal) criticism thereafter from particular legislators. This made for easier NASA-industry relations, though. It also made it possible for NASA to move on other issues in Webb’s agenda.

Among the issues Webb wanted to address was the role of universities and industry in economic and social development. Just two days prior to the announcement of the Apollo goal, on May 23, 1961, Webb sent Vice President Lyndon B. Johnson a memorandum in which he revealed that NASA-industry-university relations would have a new flavor.¹⁸ [III-7] For Webb, Apollo was both an end and a means. As an end, it served as an arena for a technological race with the Soviet Union for pride and prestige. As a means, it would provide an impetus that would allow NASA to spend a large amount of R&D money in

15. James E. Webb, “Foreword” in Rosholt, *Administrative History of NASA*, p. iv.

16. Arnold S. Levine, *Managing NASA in the Apollo Era* (Washington, DC: NASA SP-4102, 1982), pp. 65-105; Sylvia D. Fries, *NASA Engineers and the Age of Apollo* (Washington, DC: NASA SP-4104, 1991), pp. 174-83; McCurdy, *Inside NASA*, pp. 134-41.

17. On the Kennedy lunar decision, as well as the ramifications of it, see John M. Logsdon, *The Decision to Go to the Moon: Project Apollo and the National Interest* (Cambridge, MA: MIT Press, 1970); Charles Murray and Catherine Bly Cox, *Apollo: The Race to the Moon* (New York: Simon and Schuster, 1989); Roger D. Launius, *Apollo: A Retrospective Analysis*, Monographs in Aerospace History, No. 3 (Washington, DC: NASA, 1994); Andrew Chaiken, *A Man on the Moon: The Voyages of the Apollo Astronauts* (New York: Viking, 1994).

18. James E. Webb, Administrator, Memorandum for the Vice President, May 23, 1961, Administrator’s Files, NASA Historical Reference Collection.

ways that would help the country, including having government work with universities and industry in terms of regional economic development.¹⁹

Webb also told Johnson in this wide-ranging memorandum how he thought about Apollo. He mentioned the prospect, for example, of a new NASA facility to manage the Apollo program; this eventually was the Manned Spacecraft Center in Houston (later named Johnson Space Center). He suggested its possible linkage with Rice University. Webb noted that Lloyd Berkner, Chair of the Space Science Board of the National Academy of Sciences, was establishing a Graduate Research Center in Dallas, Texas, with industrial backing and that this new organization might also be brought into the alliance. Senator Robert Kerr of Oklahoma (Chair of the Senate Space Committee) also had interests in this area, and he and others saw a development potential for Arkansas and Mississippi. Even without NASA's involvement, Webb anticipated a scientific-industrial complex in California, running from San Francisco south through the new University of California at San Diego. Webb saw another center emerging around Chicago, as a pivot, and a strong northeastern arrangement with Harvard, MIT, and similar institutions. He envisioned work in the Southeast, perhaps revolving around the Research Triangle in North Carolina, in which Charlie Jonas as the ranking minority member on Albert Thomas's House Appropriations Subcommittee (which controlled the NASA budget) would have an interest. To fill out the picture, he thought NASA could help make the possibility of a southwestern complex into a reality.

It was clear that Webb thought about NASA-industry-university relations both as a procedure to secure the Apollo goal and also as a way toward advancing regional socioeconomic development. The latter end would also be a means for Apollo in terms of winning congressional support. For Webb, it was one mosaic, with each part contributing to the whole design. Thus, on May 25, 1961, when Kennedy announced the Moon decision, Webb had an institutional strategy in mind, and he was ready to go at full speed.

Early Decisions Involving Contractors

Like Glennan, Webb believed the big decisions on procurement should be made at the top. However, with NASA's budget soaring, the \$1 million level established by Glennan as the threshold for the Administrator's personal involvement was raised to \$5 million. As Webb wrote:

Dr. Dryden, Dr. Seamans, and I determined that we would personally examine, in detail, the results of the work of all source evaluation boards on competitively negotiated contracts that amounted to 5 million dollars or more. We expected these boards to appear before us personally in a formal setting and make a full and complete presentation of (1) the method chosen to break down for evaluation the contractor proposals, (2) the results achieved in the application of this method, and (3) the judgment of the board on each of the categories of the breakdown.

The fact that the three senior officers of the agency would take the time to conduct what amounted to a thorough hearing and question-and-answer period on each contractor selection action enabled

19. This approach toward handling Apollo has been explicitly laid out in Loyd S. Swenson, Jr., "The Fertile Crescent: The South's Role in the National Space Program," *Southwestern Historical Quarterly* 71 (January 1968): 377-92; Robert A. Divine, "Lyndon B. Johnson and the Politics of Space," in Robert A. Divine, ed., *The Johnson Years, vol. II: Vietnam, the Environment, and Science* (Lawrence: University Press of Kansas, 1987), pp. 217-53; Robert Dallek, "Johnson, Project Apollo, and the Politics of Space Program Planning," unpublished paper delivered at a symposium titled "Presidential Leadership, Congress, and the U.S. Space Program," sponsored by NASA and American University, March 25, 1993.

*all levels of management, in Headquarters and in our Centers, to get their questions out on the table before all three of us for debate and clarification. Another important result was that when the presentation to the three of us was over, everyone involved had a clear understanding of the elements basic to a proper decision and everyone in NASA concerned with the matter was aware of this. The burden then passed to Dryden, Seamans, and me to make the final decision, and the personnel of the boards were in position to form their own judgments as to whether the three of us did in fact arrive at the best decision as indicated by the facts and analysis. Further, an important element of a NASA-wide and pervasive self-policing system was thereby established. This has had an important effect on maintaining high standards throughout the agency.*²⁰

In the months following the Apollo announcement, NASA made one decision after another involving contracts to companies for the Moon program. The most controversial decision, made late in 1961, was the award to North American Aviation for the construction of the Apollo spacecraft. This was controversial because the Source Evaluation Board recommended in favor of a company other than North American. A number of astronauts and Manned Spacecraft Center Director Robert Gilruth believed that North American Aviation, which the Source Evaluation Board also ranked highly, was more qualified and said so to Webb, Dryden, and Seamans.

Webb had an informal policy to spread contracts around so NASA would not overly depend on any one organization. North American had already been awarded the contract for the second stage of the Saturn rocket (S-II). Hence, given the Source Evaluation Board recommendation, there was a second reason not to give this critical contract to North American. However, pressured by Gilruth and others, Webb and his senior colleagues decided in favor of North American. It was the largest single contract of the entire Apollo program.²¹

In early 1962, with most of the big hardware contracts for Apollo signed, NASA made two other industrial decisions of policy significance. These involved contracts for supporting NASA in Apollo management. One was the Bellcomm contract with AT&T. Bellcomm was a profit-making subsidiary established by AT&T in March 1962 at NASA's request to conduct analytical studies in support of Apollo. The second, a General Electric contract signed in February 1962, was to assist with the integration, reliability, and check-out of hardware at the three large spaceflight centers (Houston, Marshall, and Cape Canaveral). These two contracts, negotiated on a sole-source basis, helped NASA with the total Apollo system, whereas other contractors worked only on Apollo components.²²

One other development involving industry during the start of the Webb era is worth noting. In a November 1961 reorganization, a small Industrial Applications Office was established as part of the Office of Space Applications. The larger office was concerned with communications satellites, weather satellites, and large hardware programs, while the Industrial Applications unit concentrated on NASA technology "spinoffs" to industries outside the space arena. [III-8] This highlighted Webb's interest in the socioeconomic mission for NASA, as mentioned in his memorandum to Vice President Johnson. In the university field, Webb was similarly seeking to achieve multiple goals in parallel.

20. James E. Webb, "Foreword," in Rosholt, *Administrative History of NASA*, p. v.

21. Courtney G. Brooks, James M. Grimwood, and Loyd S. Swenson, Jr., *Chariots for Apollo: A History of Manned Lunar Spacecraft* (Washington, DC: NASA SP-4205, 1979), pp. 41-44.

22. Levine, *Managing NASA in the Apollo Era*, pp. 88-93.

Launching a New University Relationship

With the overall expansion of the space program, NASA's interactions with universities grew enormously. Most of these were in the field of space science. The November 1961 reorganization established an Office of Space Science to organize and sponsor most of this work.²³

Academic participation in Project Apollo was relatively modest compared to that of industry. However, one of the most critical contracts for Apollo did go to a university—the Apollo guidance and navigation contract awarded to MIT's Instrumentation Laboratory on August 9, 1961. This was a sole-source award, much to the annoyance of industry. NASA justified the selection because the laboratory's director, C. Stark Draper, was viewed as the country's leading expert on guidance systems.

However, the most striking aspect of NASA's university relationship came with the advent of the Sustaining University Program.²⁴ In November 1961, the Office of Research Grants and Contracts was moved under the Office of Space Science, and a new program was launched under this organization's aegis. This program aimed to use universities for socioeconomic goals.

Until 1961, NASA, like most other federal agencies supporting research in universities, concentrated on specific projects. The agency's interest in allocating resources for the best research was paramount. The consequence was that a relative handful of universities in the nation received most federal research grants and contracts. Webb inherited the "project system" and did not interfere with this basic pattern of NASA relations to academic science. Most of NASA's science money was spent on projects directed by leading academic investigators.

But Webb did not believe this was enough. [III-9] In late 1961, following considerable discussions within and outside NASA, the Administrator directed the agency to establish the Sustaining University Program.²⁵ This was intended to complement the project system model with an approach that would relate NASA to universities as institutions, rather than to specific individuals and projects. The program had three basic components: fellowships, research grants, and facilities.

The program also embodied a number of policy thrusts. One thrust was human resources, with the goal of enlarging the number of Ph.D.s in selected technical fields through fellowships. A second thrust was geographical spread, to nurture new centers of strength (as well as new talent) in university science throughout the country. NASA provided funds to universities, not to individual students. The fellowships were then awarded by those universities; hence, students had incentives to enroll there, rather than going to a few elite schools. The third thrust was the interdisciplinary principle. NASA provided research funds to support broad areas of research and involve a cross section of disciplines, including social scientists, who would study the impacts of science and technology. A fourth thrust focused on regional socioeconomic development. NASA would provide laboratory facilities—buildings—if the presidents and faculty of a university receiving a NASA facility pledged to work actively with private enterprise and community leaders in their local area, using the scientific, technological, and managerial advances being generated by the space program to benefit their regions and communities. Finally, there was

23. John E. Naugle, *First Among Equals: The Selection of NASA Space Science Experiments* (Washington, DC: NASA SP-4215, 1991), pp. 107-11.

24. For more on this subject, see W. Henry Lambright, *Launching NASA's Sustaining University Program* (Syracuse, NY: InterUniversity Case Program, 1969).

25. W. Henry Lambright and Laurin L. Henry, "Using Universities: The NASA Experience," *Public Policy* 20 (Winter 1972): 61-82.

a fifth principle that was implicit in all the rest—the enhancement of the university as an institution. NASA wanted a coherent response from the university; this meant that the university administration, especially the president, had to be a proactive force—a leader—in implementing the objectives of the Sustaining University Program.

This program went well beyond anything any other department or agency was doing (or even considering) at the time. NASA had no specific legislative authority to do what it did, but, in the environment of Apollo, it was possible for an individual with Webb's goals and skills to innovate in ways that would be impossible later. [III-10] The president and key legislators gave Webb enough leeway to start the Sustaining University Program in 1961. Once under way, the program's geographical spread attracted a considerable constituency. There is no doubt that the ability of NASA to reach most states through the Sustaining University Program helped build support for the agency. However, the broader notions of using universities for a NASA-based socio-industrial policy mattered to Webb. The historian Walter McDougall contends that Webb aimed at building a "Space Age America."²⁶ If so, a major part of the leverage was to be supplied by the Sustaining University Program and the "space age university." Thus, by early 1962, the NASA-industry-university partnership had been forged anew. Although an extension of the Glennan period, it bore the distinct stamp of James Webb, especially with respect to NASA's university relations. [III-11]

“Incentivizing” Contracts

One of the problems of R&D contracting was that technical uncertainties made it difficult to judge how much it would cost to create a particular item of hardware. Hence, most of the industrial contracts NASA awarded in the late 1950s and early 1960s were cost plus fixed fee. In 1962, Administrator Webb participated in an interagency task force headed by David Bell, Director of the Bureau of the Budget. The report of this group (the "Bell Report") examined various aspects of the public-private relationship between government and industry.²⁷ Webb was a major participant on the task force, and the report emphasized areas in which NASA was already moving.

One of these was the notion of "incentivizing contracts" so that industry would have some motivation to perform well and save money. Following some internal studies and the advice of Robert Charles, who served as Webb's special assistant for procurement in 1963, NASA established more and more contracts with incentive provisions. The basic notion of NASA contracting would claim that "significant improvement in product quality . . . timeliness and cost can be achieved if the procurement process is saturated with competition before contract execution, and with performance and cost reduction incentives thereafter." In late November 1963, NASA directed that the number of cost-plus-fixed-fee contracts be reduced substantially and that incentives be considered for all contracts. Many existing contracts were subsequently converted to incentive arrangements, including the North American contract for the Apollo spacecraft. Doing so was difficult. In some cases (such as the North American contract), the process was achieved over a period of years.²⁸

26. McDougall, *Heavens and the Earth*, p. 361.

27. This has been published as Document IV-9, *Report to the President on Government Contracting for Research and Development*, Bureau of the Budget, U.S. Senate, Committee on Government Operations, 87th Cong., 2d sess. (Washington, DC: U.S. Government Printing Office, 1962), pp. vii-xiii, 1-24, in Logsdon, gen. ed., *Exploring the Unknown*, 1: 651-72.

28. Levine, *Managing NASA in the Apollo Era*, p. 77.

Bringing Projects Under Greater Control: Phased Project Planning

During 1964-1965, NASA leaders made an effort to bring industrially managed projects under greater control. Webb's view was that "when you let the contract, all you've done is started a process that with the greatest of care, and ability, and drive will produce a bird. All you've done is put in motion forces that have the capability but which could fail at any point along the line."²⁹

In the mid-1960s, NASA received increasing criticism from members of Congress and others who believed too much was being spent on space versus the Great Society or Vietnam. Webb believed that NASA had to be especially careful to avoid even the appearance of mismanagement of its industrial contracts (cost overruns, schedule slippages, and so on), because this would give critics a wedge to attack the entire program.³⁰

In 1964, the deputy of Robert Seamans, Earl Hilburn, studied NASA's methods of scheduling and project cost estimation. In 1965, the results of Hilburn's analysis were implemented in the form of a new agency policy, "phased project planning," to define programs more explicitly. This policy was aimed at conducting R&D contracts in a number of sequential phases with maximum competition characterizing the "phase-by-phase increments of project execution," with each phase allowing for "the fundamental concept of agency top management participation at all major decision points."³¹ Presumably, government could terminate the contract at each phase and go elsewhere if dissatisfied. It also permitted better opportunities for an agency to keep track of costs and schedules.

Phased project planning was "predicated on the assumption that NASA employees would be responsible primarily for defining programs and providing technical direction to agency contractors."³² The concept that government would direct industry in large-scale development programs was also a critical principle of the Bell Report. For the most part, NASA felt exceedingly capable of exercising technical management. But there was one area where the agency did not, and this caused NASA to create a new in-house center.

The Electronics Research Center

As the space program grew, it became evident that electronics was a crucial disciplinary area, cutting across virtually every NASA field. As one scholar, Thomas Murphy, concluded:

*NASA specialists estimated that forty percent of the cost of the space boosters would be accounted for by electronics components. The figure was even higher with respect to spacecraft, where it was estimated that fifty percent of the cost involved electronics. In the tracking and data acquisition elements of the program, as much as ninety percent of the resources were electronics-oriented.*³³

29. *Ibid.*, p. 80.

30. See Document III-17, *Summary Report: Future Programs Task Group*, January 1965, in Logsdon, gen. ed., *Exploring the Unknown*, 1: 73-90.

31. Levine, *Managing NASA in the Apollo Era*, p. 84.

32. *Ibid.*, pp. 84-85.

33. Thomas Murphy, *Science, Geopolitics, and Federal Spending* (Lexington, MA: D.C. Heath, 1971), p. 226.

NASA leaders were increasingly feeling the need to have more in-house competence to direct the vast electronics work being performed by industry and universities. "NASA management was very sensitive to avoiding some of the problems the Air Force had experienced," Murphy added, "in relying too heavily on contractors whose work it lacked the ability to evaluate."³⁴

Webb, Dryden, and Seamans decided in 1962 that NASA needed an Electronics Research Center and that the best place in the country to put it was the Boston area. They wanted it located where frontier research was going on in universities and where there was a concentration of the electronics industry. In their view, the Harvard-MIT-Route 128 complex made the Boston area a natural. There was also relatively less NASA work in this region, compared to California, another possible site. Finally, Webb no doubt viewed the Boston area as an ideal site to test his vision of government, industry, and university cooperation.

The problem was that the Boston area was Kennedy territory. Not only was the president from Massachusetts, but his younger brother Edward (Ted) was running for senator in the fall of 1962 with the slogan: "I can do more for Massachusetts." Webb kept quiet about the Electronics Research Center decision, informing the president, but not making it known even in preliminary discussions with the Bureau of the Budget. He feared a leak that would mix NASA interests with the Massachusetts election. After Ted Kennedy's election, the decision was made known to the Bureau of the Budget and became official when NASA submitted its budget to Congress in early 1963.³⁵

The protests were large and immediate, with most of the criticism coming from Midwest legislators. The "taint" of political favoritism was charged, and Webb denied it. However, those against the siting choice prevailed in Congress to the extent that the Electronics Research Center's approval was made contingent on NASA conducting a nationwide search for sites. NASA conducted the required search, and this did not change the final outcome, but it did delay the start in building the center (in Cambridge, Massachusetts) by a year. By that time, Lyndon Johnson had become the president.³⁶

NASA's Controversy With the California Institute of Technology's Jet Propulsion Laboratory

In January 1964, Ranger 6—one of the space vehicles designed to study landing sites on the Moon prior to NASA's sending astronauts—failed. This was the sixth Ranger flight in a row to fail, and so much effort had been invested in this particular flight to make it succeed that its failure brought many festering issues to light. The Ranger failure raised questions about the relationship between NASA and the California Institute of Technology's (Caltech) Jet Propulsion Laboratory (JPL).³⁷

The primary issues were the responsiveness to NASA of JPL, which was in charge of Ranger, and JPL's capacity to manage large technology projects. JPL was different from all other NASA centers in that it was not a civil service organization. The laboratory grounds, buildings, and equipment belonged to the government, but the laboratory itself—as an

34. *Ibid.*

35. Lambright, *Powering Apollo*, p. 121.

36. Jan Van Nimmen and Leonard C. Bruno, with Robert L. Rosholt, *NASA Historical Data Book, Vol. I: NASA Resources, 1958-1968* (Washington, DC: NASA SP-4012, 1988 ed.), pp. 285-94.

37. See Homer Newell, *Beyond the Atmosphere: Early Years of Space Science* (Washington, DC: NASA SP-4211, 1980), pp. 258-73.

organization—was part of Caltech, and its staff were Caltech employees. JPL identified with the academic values of Caltech, and Caltech charged NASA for managing JPL.

JPL had been accustomed to near-total autonomy under its previous sponsor—the Army—and had expected the same under NASA. There were special provisions in JPL contracts—a mutuality clause—indicating that JPL could refuse to perform certain kinds of work that did not suit its interests. However, two factors created seeds for change. The first was the Apollo decision, which gave a special urgency to Ranger and changed it from a research-oriented lunar science project to an enabling mission for Apollo. In response, NASA wanted to install a general manager under the JPL director who would instill project management values and skills. JPL needed to give more attention to deadlines, costs, and tight engineering procedures. The second factor was Webb's desire for more response from Caltech to Washington's management directives.

As part of its management responsibility, according to Webb, Caltech should be more involved with JPL, getting the laboratory to interact with other universities and industry in California. JPL should set an example for the universities under the Sustaining University Program to follow. Caltech president Lee DuBridge, however, was not interested in doing what Webb wanted, and he told Webb that.³⁸

This institutional struggle continued into the early 1960s. JPL had on its side both prestige and a history of independence. NASA, however, supplied the money, and the Caltech-JPL contract was up for renewal. What tipped the scales in favor of NASA was Ranger 6. The Ranger disaster first produced a NASA investigation and then a congressional inquiry. Because of these inquiries, Caltech's Board of Trustees became involved.

Webb protected Caltech and JPL from congressional actions that might have gone too far in punishing these institutions. At the same time, he bargained with Caltech's Board of Trustees to get more control over JPL. The chairman of Caltech's Board of Trustees, Arnold Beckman, became a Webb ally, and the pressure on Caltech and JPL to change became too strong to resist. [III-12, III-13] The mutuality clause was removed, there was agreement by Caltech and JPL that a general manager would be appointed, and the Caltech fee was made subject to performance evaluation. [III-14, III-15] Webb was unable to get DuBridge to go along with his vision of a "space age university," but Webb never stopped trying. Most importantly, from the standpoint of buffering the NASA-Caltech-JPL partnership from a congressionally mandated restructuring, Ranger 7 was launched on July 28, 1964, and was successful.³⁹

Problems With the Sustaining University Program

Starting in 1966, Webb initiated several studies on how the Sustaining University Program was doing.⁴⁰ What he found was that by most "standard" measures of a successful government-university program, the Sustaining University Program was doing very well indeed. The fellowship program was highly regarded in the academic community. The facility grants provided badly needed buildings. The research money was put to work in ways that could be described as interdisciplinary, in comparison to traditional research groupings, although in most cases this involved relations among physical and life scientists rather than between such "hard" scientists and social scientists.

38. Clayton R. Koppes, *JPL and the American Space Program* (New Haven, CT: Yale University Press, 1982), Ch. 8.

39. R. Cargill Hall, *Lunar Impact: A History of Project Ranger* (Washington, DC: NASA SP-4210, 1977), pp. 256-70.

40. See Lambright and Henry, "Using Universities"; Lambright, *Launching NASA's Sustaining University Program*.

Webb was disappointed, however, with the university response to his desire for innovative approaches to complex problems. He had signed a memorandum of understanding (MOU) with each university president receiving a facility grant. These MOUs included commitments by the presidents to work on the Sustaining University Program's broader goals. For example, they were to seek new and more effective ways to make research results available to external clientele. There were reports on some campuses of industrial advisory committees, conferences on applications of new findings, outside consulting relationships of individual faculty members, and so on. But most of these initiatives seemed trivial to Webb. He was seeking a more profound response, basic attitude changes, a major restructuring of campuses, and new external relationships for academic professionals.⁴¹

Webb badgered his staff and eventually reorganized and changed the leadership of his Office of Research Grants and Contracts. However, the more fundamental problems were on the campuses of the United States. A task force that he appointed to study NASA-university relationships told him in 1968: [III-16]

The failure of the universities to respond to the explicit agreements of the memorandums—technology transfer and multidisciplinary research—suggests that the [Sustaining University Program] goals, which they contained implicitly, were not achieved. Thus, the [Sustaining University Program] facilities program cannot claim to have developed concern for societal problems, capability for institutional response, awareness of a service role, or strengthened ties with industry and the local and regional community.

The major criticism that must be made of the universities' response to the Memorandum of Understanding is that they did not try. They clearly committed themselves to make an "energetic and organized" effort to implement the memorandums, and then did not make it.⁴²

The year 1967 was the turning point for the Sustaining University Program, as well as a turning point for NASA in general. The reasons behind this shift reflected Webb's policy dissatisfaction, but they were more closely related to budget constraints. President Lyndon Johnson, in putting together the federal budget that went to Congress that year, looked everywhere for budget savings to finance the conflict in Southeast Asia, which was now becoming his dominant preoccupation. The Sustaining University Program was nice to have, but not really essential, in the president's view, and he ordered Webb to terminate the program.

Given his own frustration with the program's results, Webb was not in a good position to defend the universities. Indeed, as Vietnam protests on campuses heated up, Johnson was not anxious to listen to any defense of academia. The best thing Webb could accomplish was to get permission to curtail, rather than terminate, the program and to do so over time. Webb had just a few more initiatives he wished to try before closing the program—initiatives that included research in administration and management, engineering systems design, and aid to historically black colleges and universities.

The \$31 million budget for the Sustaining University Program was slashed to \$10.9 in fiscal year 1968 (calendar year 1967). As Webb left NASA in November 1968, the program was scaled down even further, and it was eventually terminated completely by President Richard M. Nixon. The program's funding ended officially in 1970.

41. Laurin L. Henry, *The NASA-University Memoranda of Understanding* (Syracuse, NY: InterUniversity Case Program, 1969).

42. Homer Morgan, et al., *A Study of NASA University Programs* (Washington, DC: NASA SP-185, 1968), p. 58.

The Sustaining University Program's lifetime ran from 1961 to 1970 (fiscal years 1962 to 1971). It obligated more than \$200 million to research, training, and facilities that complemented and facilitated NASA's larger research project effort. Some of the program's accomplishments are as follows:

- More than 4,000 graduate students at more than 100 universities were financed in space-related disciplines.
- About 1,400 faculty members participated in research and design projects at NASA centers during the summers.
- Thirty-seven research laboratories were built on university campuses.
- More than 3,000 space-related endeavors were carried out under the research portion of the program.

Successful by almost every customary standard, the Sustaining University Program enlarged the personnel base from which to draw aerospace scientists and engineers, brought new universities into aeronautics and space research, facilitated regular participation by scientists in NASA project research, consolidated disparate research endeavors into space "centers" on campus, and served as a model for other agencies with regard to institutional grants, geographical spread, and other features. It even stimulated many social scientists to focus on science policy and technology as a dominant concern. What the program did not do was meet the broader criteria set by Webb:

He hoped to see more innovation and change in universities—broader capabilities for multidisciplinary research, university concern with the technology transfer process, increased involvement with industry and community and regional problems, developing capability for institutional response to societal need. These hopes were largely disappointed. By the late 1960s, there was evidence on some campuses of movement in the directions Webb sought, but just as these were appearing [the Sustaining University Program] ended.⁴³

Problems With Industry: NASA's Relationship With North American Aviation

Without question, the NASA-industry-university partnership had produced the successes of the Mercury program. This partnership was so effective in the Gemini program that it won an award for achievement in 1966 as an example of excellence. In January 1967, however, the Apollo fire occurred, taking the lives of three astronauts while they conducted tests in a space capsule on the launch pad.⁴⁴ This served to focus attention on problems in the relationship of NASA with North American Aviation, the builder of the Apollo spacecraft. No doubt, some of the issues involved were present where other government-industry interactions were concerned. However, the NASA-North American problems were especially significant, given the central role North American played in

43. Lambright and Henry, "Using Universities," p. 73.

44. On the Apollo 204 capsule fire, see "The Ten Desperate Minutes," *Life*, April 21, 1967, pp. 113-14; Erik Bergaust, *Murder on Pad 34* (New York: G.P. Putnam's Sons, 1968); Mike Gray, *Angle of Attack: Harrison Storms and the Race to the Moon* (New York: W.W. Norton and Co., 1992); Erlend A. Kennan, and Edmund H. Harvey, Jr., *Mission to the Moon: A Critical Examination of NASA and the Space Program* (New York: William Morrow and Co., 1969).

Apollo, and the resulting managerial solution was an example of what Webb called “innovating our way” out of a problem.⁴⁵

The North American controversy went back to the original award of the Apollo spacecraft contract. As noted, this was one of those rare occasions when Webb, Dryden, and Seamans overruled the Source Evaluation Board. Charges of “politics” were hurled at the time, and not forgotten in subsequent years by NASA critics. What made the North American Aviation award stand out was its size and the fact that it made the corporation the single most important contractor for NASA in terms of sheer work.

The nature of the Apollo program was such that it entailed a relatively small number of huge awards. North American received two of these. The six largest NASA contract awards made to industry all involved Project Apollo. The expenditures on these contracts through fiscal year 1969 are shown in the following table.

Major NASA Contracts (cumulative awards through 1969)

<i>Contract</i>	<i>Contractor</i>	<i>Cost (in billions)</i>
Apollo Spacecraft	North American Aviation	3.345
Lunar Excursion Module	Grumman Aerospace	1.914
S-IC Stages of Saturn V Rocket	Boeing Company	1.377
S-II Stage of Saturn V	North American Aviation	1.269
S-IVB Stage of Saturn V	McDonnell Douglas	1.097
Apollo Integration and Systems Support	General Electric	0.754

Source: NASA, *Annual Procurement Report*, FY 1969, p. 30. Cited in “R&D—The Government-Industry Relationship,” Thomas P. Murphy, *Science, Geopolitics, and Federal Spending* (Lexington, MA: D.C. Heath, 1971), p. 173.

Hence, from 1961 on, NASA knew it had an unusually dependent relationship with North American Aviation. Marshall Space Flight Center managed the S-II contract on behalf of NASA, and the Manned Spacecraft Center managed the Apollo spacecraft contract. NASA worried that North American was not always giving the agency’s work the attention required.

45. Numerous inquiries took place concerning the Apollo 204 capsule fire. See U.S. House, Committee on Science and Aeronautics, *Apollo and Apollo Applications: Staff Study for the Subcommittee on NASA Oversight of the Committee on Science and Aeronautics*, U.S. House of Representatives, Ninetieth Congress, Second Session (Washington, DC: U.S. Government Printing Office, 1968); U.S. House, Committee on Science and Aeronautics, *Apollo Program Pace and Progress: Staff Study for the Subcommittee on NASA Oversight*, Ninetieth Congress, First Session (Washington, DC: U.S. Government Printing Office, 1967); U.S. House, Committee on Science and Aeronautics, Subcommittee on NASA Oversight, *Apollo and Apollo Applications: Staff Study*, Ninetieth Congress, Second Session (Washington, DC: U.S. Government Printing Office, 1968); U.S. House, Committee on Science and Aeronautics, Subcommittee on NASA Oversight, *Investigation into Apollo 204 Accident, Hearings*, Ninetieth Congress, First Session, three volumes (Washington, DC: U.S. Government Printing Office, 1967); U.S. Senate, Committee on Aeronautical and Space Sciences, *Apollo Accident Hearings*, Ninetieth Congress, First Session, seven volumes (Washington, DC: U.S. Government Printing Office, 1967); U.S. Senate, Committee on Aeronautical and Space Sciences, *Apollo 204 Accident: Report of the Committee on Aeronautical and Space Sciences*, United States Senate, with *Additional Views* (Washington, DC: U.S. Government Printing Office, 1968).

During the early years of the relationship, North American Aviation developed a negative reputation within NASA. The company, for its part, thought NASA's criticism unfair. By 1965, the delays on both the S-II and the spacecraft were long enough for NASA Headquarters to become truly concerned. Late in 1965, the director of the Apollo program within the Office of Manned Space Flight, U.S. Air Force General Samuel C. Phillips, organized a "tiger team" of NASA specialists who went to North American to investigate what was going on. Phillips prepared a highly critical report that would later become notorious as the "Phillips Report." In the report, a series of extreme criticisms were pointed directly at North American. [III-17, III-18]

During 1966, North American worked to respond to the NASA criticisms; however, problems continued. The most visible ones were recounted by *Aviation Week and Space Technology*, a trade journal, on November 21, 1966. It reported on a "crisis" threatening the U.S. Moon landing venture.⁴⁶ The specific problems reported in the article included the structural failures of both a North American command module fuel tank and the S-II stage. They were indeed serious problems, so much so that Webb felt obliged to alert President Johnson to them.

NASA and North American did in fact quickly address these known issues. By the end of 1966, the situation was looking so good that optimism prevailed among NASA's technical people. However, one technical issue that was not addressed was the possibility of a fire in the pure oxygen atmosphere of the space capsule. The fire problem did not become an issue until it actually occurred in January 1967. Indicative of the tangled state of NASA-North American Aviation relations at the time was the circumstance that NASA and its contractor were haggling over a renegotiation in their basic agreement at the turn of the year. This most significant of all the NASA-industry partnerships was actually held together only by a letter contract as 1967 began.

The fire took place January 27, 1967, and threw NASA-North American relations into turmoil. NASA established an internal accident review board, which was followed by a series of congressional investigations. With the benefit of hindsight, it can be seen that the first six months after the fire was a period of crisis management, with the succeeding months a time of recovery. During the crisis management period, media attention was searching and accusatory. The NASA-North American partnership was a target, as was the performance of the NASA Administrator in particular.

There were charges that the original award to North American Aviation was a result of political pressure led by North American lobbyist Fred Black and a former Lyndon Johnson associate and Washington insider named Bobby Baker. Meanwhile, the NASA investigation showed that NASA and North American were both at fault, with many errors of both omission and commission. Webb concluded that the basic relationship was sound; however, "surgical" changes would have to be made. This meant key personnel changes; the head of NASA's Apollo spacecraft project office in Houston was replaced. At Webb's adamant insistence, his counterpart at North American was also replaced. The NASA-North American contract was renegotiated so that the contractor was penalized financially for the accident. And most importantly, a new contract was negotiated with Boeing to certify that "the whole unit, vehicle and payload, does function together, is compatible, and is ready for flight." The Boeing contract was announced by Webb in congressional testimony on May 9, 1967.⁴⁷ All these actions were taken rapidly, largely at the command of Webb, and sometimes after bitter discussions between Webb and North American

46. "Problems Force Drastic Apollo Rescheduling," *Aviation Week and Space Technology*, November 21, 1966, p. 36

47. Levine, *Managing NASA in the Apollo Era*, p. 90.

President, J. Leland Atwood, with Webb threatening to take the Apollo contract away from North American unless the company went along—which it ultimately did.

All this happened while Webb defended publicly and before Congress the basic strength of the NASA-North American system. Congress and Webb engaged in a major struggle over the right of Congress to see the aforementioned “Phillips Report” that had been so critical of North American. Webb regarded NASA’s ability to deal frankly and privately with contractors as critical to its ability to root out problems at an early stage and then address them. In the end, Webb let Congress see the Phillips Report only in executive sessions of the Senate and House space committees.

After six months, the crisis decision making gave way to recovery. The wounds between NASA and North American Aviation began to heal. For everyone, the Apollo lunar landing in 1969 marked the final evidence of successful recovery. The Apollo fire, while not forgotten, became much less significant in the wake of this triumph. The issues in the NASA-North American relationship became matters for historians rather than policy makers. The successful lunar landing quite properly refocused attention on the positive aspects of NASA’s industrial and university partnerships.

Other Organizational Innovations: Research Institutes

The basic relationship NASA had with industry and universities was a direct one. NASA addressed a university or corporation one-on-one. However, the agency experimented in its early years with other approaches to getting its work done. One approach worth documenting was the creation of a research institute. Its earliest manifestation originated in the Glennan years and grew under Webb. A different version came into being at the end of the 1960s, and a third variation was born in the 1970s.

One of these was the Institute for Space Studies. Robert Jastrow, a NASA physicist and scientific administrator, was concerned that NASA needed to have a close relationship with the best scientific minds in the country for its theoretical space science work. He proposed to Glennan that a special institution be established. In December 1960, Glennan approved setting up the Institute for Space Studies in New York City. It was established as an arm of the Goddard Space Flight Center, but with considerable autonomy over the choice of its research activities. The institute would have a small in-house staff and be a place where notable scientists could come and work for relatively brief stays. It would also work closely with Columbia University and other institutions in the New York City area. The institute flourished in the 1960s and evolved various programs of interaction with universities, succeeding in its prime objective of linking NASA more closely to the very best space science theorists. Such individuals came to NASA via fellowship and other arrangements with the institute.⁴⁸

Another organization NASA created was the Lunar Science Institute, which was founded on a different kind of model—the university consortium. The origins of the Lunar Science Institute lay in the realization in the late 1960s that as Apollo flights brought lunar samples and other data back to the Manned Spacecraft Center, there was a need to maximize the use of these samples and other data by non-NASA space scientists.

The Institute for Space Studies was obviously a model, but NASA’s Manned Spacecraft Center in Houston, in contrast to Goddard (which ran the Institute for Space Studies), was not oriented toward science. Instead of an institute managed by a NASA center, Webb turned to the possibility that an institute might be managed by a university or a group of

48. Van Nimmen and Bruno, with Rosholt, *NASA Historical Data Book, Vol. 1*, pp. 314-25.

universities. With the help of the National Academy of Sciences, NASA established the Lunar Science Institute, based near the Manned Spacecraft Center. [V-19] Then, on March 12, 1969, NASA formed a university-based consortium, called the University Space Research Association, to manage the institute, which remained in Houston.

However, the Lunar Science Institute was launched at a time of budget shrinkage, whereas the Institute for Space Studies had been born during a time of growth. The new entity was not greeted with enthusiasm by civil servant-led NASA entities that were hard-pressed to defend existing resources. Personality issues exacerbated the situation. The Lunar Science Institute survived, but it left a legacy that was controversial.⁴⁹

A somewhat later and entirely different approach to these institutions was the Space Telescope Science Institute. By 1970, NASA had a number of ambitious space science projects on its agenda, but because of budget cutbacks and government-academic rivalries, relations between NASA and the scientific community had deteriorated. The agency consciously searched for better ways to deal with the community. The space telescope, a high-priority program for scientists as well as for NASA, became a vehicle for finding a solution to what Homer Newell has described as a "love-hate relationship." Astronomers, those scientists most concerned with the telescope, had Kitt Peak National Observatory and other national facilities in mind. They called for an institute that would be managed by a university consortium and located at a university to maximize their control over the telescope's observation agenda. NASA, which had its own in-house scientists, did not wish to relinquish such control. NASA insisted that it was a mission agency, not the National Science Foundation.⁵⁰

University astronomers and NASA scientists (chiefly at Goddard Space Flight Center) fought for the next few years. By 1975, an important inside ally of academia emerged. [III-20] This was Noel Hinners, Associate Administrator for Space Science. For Hinners, "an institute could solve two problems: one, pacify, if you will, the ground based astronomy community, so that they'd be all the more supportive of the Space Telescope, and two, really provide an external advocate for a good operations program." In short, Hinners concluded that unless NASA had a united constituency outside NASA to help promote the telescope, the agency could not get the necessary resources to have a telescope at all. This meant giving the astronomers what they wanted: the Space Telescope Science Institute.⁵¹

Hinners arranged for the National Academy of Sciences to study the plan and eventually added its blessing to the institute in 1976. [III-21] In 1978, NASA Administrator Robert Frosch followed suit. NASA Headquarters backed the academic astronomers over the NASA scientists, and Hinners announced the NASA decision to Congress, pointing out that the agency would retain operational control of the telescope in orbit. [III-22] On January 16, 1981, following a vigorous competition, Frosch announced that a university consortium based at Johns Hopkins University in Baltimore, Maryland, would receive the contract to operate the Space Telescope Science Institute; it has been in operation since that date.⁵²

49. Newell, *Beyond the Atmosphere*, pp. 240-42.

50. The story of this institute's creation has been told in Robert W. Smith, with contributions by Paul A. Hanle, Robert H. Kargon, and Joseph N. Tatarewicz, *The Space Telescope: A Study of NASA, Science, Technology, and Politics* (Cambridge, England: Cambridge University Press, 1989), pp. 207-8, 226, 337-39, 342-52.

51. *Ibid.*, p. 187.

52. *Ibid.*, pp. 187-220.

Changing NASA-University Relations

During the latter 1970s, there were several efforts to improve the efficiency and effectiveness of NASA's administration of research grants and contracts to colleges and universities. In 1977 and 1978, a review of the entire program led to several reforms to improve accountability, ensure quality, and establish mission criticality for university research supported by NASA.⁵³ [III-23, III-24]

Even if these reforms were successful, other difficulties had emerged by the early 1980s as the launch rate of scientific satellites by NASA had dropped from its peak of four to five missions a year to only one or two annual flights. Moreover, the Sustaining University Program had disappeared a decade earlier, and NASA's graduate fellowship program had been terminated. Indeed, the purchasing power of the space science budget had been cut almost in half over a two-decade period. Contrary to expectations, frequent opportunities to carry out scientific investigations on the Space Shuttle were not emerging.⁵⁴

In this context, NASA in 1983 undertook a comprehensive re-examination of its relationship with American universities. This review validated the perception that there were serious problems in the relationship and proposed a series of steps that NASA might take to address those problems. [III-25] However, most of those steps fell victim to continuing pressures on the Office of Space Science and Applications budget; only the recommendation to reinstitute a Graduate Fellowship Program was fully implemented. By the mid-1980s, the NASA space and Earth sciences program, including its university-based component, perceived itself in a crisis situation; the intimate and mutually productive relationship that had developed over the past quarter century required revitalization.⁵⁵

A new wrinkle to NASA-university relations took place in 1988, when Congress passed the National Space Grant Act, which established a national program of space grant colleges and universities eligible for a major fellowship program. [III-26] With the first competitive awards for fellowships in 1989, 21 independent space grant consortia began operation. Three years later, the number of consortia stabilized at 52. The intent of this program was to:

- Continue to strengthen the national network of colleges and universities with interests and capabilities in aeronautics, astronautics, Earth systems, space science and technology, and related fields
- Encourage cooperative programs and collaborations among colleges, universities, business and industry, and federal, state, and local governments
- Promote programs related to aeronautics, astronautics, Earth systems, and space science and related technology in the areas of research, education, and public service

53. Robert A. Frosch, NASA Administrator, to Frank Press, Director, Office of Science and Technology Policy, Executive Office of the White House, December 12, 1977; Walter C. Shupe, NASA Director of GAO Liaison Activities, to Distribution, "GAO Survey of NASA's Administration of Research Grants and Contracts to Colleges and Universities," March 2, 1978; W.A. Greene, NASA Chief of Policy Coordination, to Director of Contract Pricing and Finance Office, "Policy on Advance Payment of Contract Financing," June 2, 1978; Walter C. Shupe, NASA Director of GAO Liaison Activities, to Distribution, "Comments on GAO 'discussion paper' on NASA's administration of research grants and contracts with universities," June 28, 1978, all in University Affairs Files, NASA Historical Reference Collection.

54. NASA/University Relations Study Group, Office of Space Science and Applications, "The Universities and NASA Space Sciences," Initial Report, July 1983, p. 1, copy in NASA Historical Reference Collection.

55. Space and Earth Science Advisory Committee, NASA Advisory Council, *The Crisis in Space and Earth Science: A Time for a New Commitment*, November 1986, copy available in NASA Historical Reference Collection.

- Recruit and train U.S. citizens for careers in aeronautics, astronautics, and space science and related technology, placing special emphasis on diversity by recruiting women, underrepresented minorities, and persons with disabilities
- Support the national agenda to develop a strong science, mathematics, and technology education base from elementary through university levels⁵⁶

This partnership infused various educational institutions in the United States with funding from NASA to further aerospace science and technology in the same way that the National Land Grant College Act of 1862 made federal resources available for higher education in the nineteenth century.

A New Role for NASA—Supporting U.S. Industry

One of the themes that President Ronald Reagan's administration brought to Washington in 1981 was increased reliance on the U.S. private sector, rather than the government, to take the lead in developing new areas of economic and societal activity. With respect to the space program, there was a flurry of interest in "privatizing" various elements of the government's activities, including the Landsat program, the operation of expendable launch vehicles, and even the construction and operation of additional Space Shuttle orbiters. Another area of emphasis was the potential for substantial economic returns from space; one influential projection was that by the year 2000, the annual revenue from commercial activities in space could reach \$65 billion.⁵⁷ The White House issued a National Commercial Space Policy in 1984; in response, NASA developed a "NASA Commercial Use of Space Policy" during the same year. [III-27] This policy was intended to implement a new goal for the space agency—partnerships with U.S. industry to "expand opportunities for U.S. private sector investment and involvement in civil space and space-related activities."⁵⁸

In response to this emphasis on space industry, NASA established in September 1984 an Office of Commercial Programs, to be overseen by an associate administrator at the NASA Headquarters level. This new entity was intended to provide "a focus for and facilitate efforts within NASA to expand U.S. private sector investment and involvement in civil space related activities." Specifically, NASA Administrator James M. Beggs intended the office to foster:

- New commercial high-technology ventures
- New commercial applications of existing space technology
- Unsubsidized initiatives aimed at transferring existing space programs to the private sector⁵⁹

56. *National Space Grant College and Fellowship Program: The First Five Years, 1989-1994* (Washington, DC: NASA Education Division, n.d.), p. 17.

57. For one version of this forecast, see David Lippy, as quoted in *The New York Times*, June 24, 1984, Sec. 3, p. 1. For a sample of the discussion about the commercial potentials of space, see Aerospace Industries Association of America, *A Current Perspective on Space Commercialization*, (Washington, DC: Aerospace Research Center, 1985); Business-Higher Education Forum, *Space: America's New Competitive Frontier*, April 1986; John M. Logsdon, "Space Commercialization: How Soon the Payoffs?," *Futures* 16 (February 1984); John M. Logsdon, "Status of Space Commercialization in the U.S.A.," *Space Policy* 2 (February 1986).

58. James M. Beggs, NASA Administrator, Memorandum to Officials-in-Charge of Headquarters Offices and Field Installations, "NASA Commercial Use of Space Policy," October 29, 1984, Administrators Files, NASA Historical Reference Collection.

59. James M. Beggs, NASA Administrator, Special Announcement, "Establishment of the Office of Commercial Programs," September 11, 1984, Administrators Files, NASA Historical Reference Collection.

Since it was first established in 1984, the Office of Commercial Programs has enjoyed mixed success in meeting the objectives laid out in the original charter.⁶⁰

NASA, as an R&D organization created to carry out national science and exploration objectives in space, found its new relationship with an emerging but uncertain commercial space sector difficult to incorporate into its long-established patterns of institutional behavior. While a number of the initiatives contained in the 1984 Commercial Use of Space Policy were formally put into practice (perhaps most notably a network of university-based Centers for the Commercial Development of Space that brought industry and university researchers together with funding from both NASA and industry), a combination of mixed returns from early commercially oriented experiments, the *Challenger* accident and the resultant dramatic decrease in Space Shuttle flight opportunities, and institutional resistance at NASA meant that space commercialization never got very high on the agency's list of priorities for its future.

The emphasis on government-industry cooperation in commercializing space had another implication for NASA; other government agencies began to take a more active role in space-related issues that NASA had previously thought were its exclusive purview. During the 1980s, the Department of Commerce created an Office of Space Commerce, while the Department of Transportation formed its own Office of Commercial Space Transportation. Operating through the Executive Branch interagency process, these organizations were often critical of how NASA was carrying out its new partnership with industry. At other times, they pushed for new roles for NASA in the commercialization process. By the last year of the Reagan administration, commercialization advocates within the government were able to delay the release of a new statement of national space policy until it was accompanied by a set of commercially oriented initiatives. [III-28] The proliferation of space organizations within the government was not a comfortable development for NASA.

The efforts toward greater commercialization of space activities did not abate with the change of administrations in 1989. In January of that year, George Bush succeeded Ronald Reagan as president, with whom he had served as vice president. Bush continued to emphasize the development of space industry. During the Bush administration, the shaping and articulation of space policy were the work of the National Space Council, a descendant of the National Space Council first established in 1958 under the National Aeronautics and Space Act (Public Law 85-568). Chaired by Vice President Dan Quayle, the council consisted of the heads of all federal departments or other high-level offices having either a programmatic role or legitimate concern in federal government space activities, including NASA, the Department of Commerce (which contains the National Oceanic and Atmospheric Administration), the office of the director of the Central Intelligence Agency, and the office of the chairman of the Joint Chiefs of Staff, among others.

Several of the National Space Council's policy declarations, designated "National Space Policy Directives" (NSPD), related directly to commercial space policy. NSPD-2 ("Commercial Space Launch Policy") [III-29] reflected the administration's commitment in 1990 to developing a thriving commercial space sector by establishing "the long-term goal of a free and fair [space launch] market in which the U.S. industry can compete" internationally. NSPD-3 [III-30] elaborated the administration's commercial space policy

60. NASA Management Instruction 1103.38, "Role and Responsibilities—Assistant Administrator for Commercial Programs," November 6, 1984; James M. Beggs, NASA Administrator, to Edward P. Boland, Chair, Subcommittee on HUD-Independent Agencies, House of Representatives, December 27, 1984; NASA Press Release, "New NASA Initiatives Encourage Commercial Space Activity," November 3, 1987, all in NASA Historical Reference Collection.

with specific guidelines “aimed at expanding private sector investment in space by the market-driven Commercial Space Sector.” Each of these documents emphasized a strong presidential commitment to commercial space activity. Each also helped redefine the relationship of NASA to the space industry.⁶¹

Privatizing the Space Shuttle

One of the most potentially significant developments in NASA’s history of private sector relations has been the privatization effort for the Space Shuttle. The Space Shuttle has been seen as a momentous technological innovation that has gone from R&D to operations. As it has made that transition, many observers have suggested that NASA, whose mission is R&D, should “spin off” the shuttle to the private sector. In the early 1980s, NASA administrators spoke of this eventuality taking place by 1990.

The transition did not take place in light of the 1986 *Challenger* accident, which showed the shuttle to be far less routine than NASA officials believed. The Space Shuttle is a piloted vehicle, and it is utterly indispensable for many of the most important NASA activities, including the space station. The notion of “operational” has, therefore, had to be redefined. In a real sense, the shuttle is not routine, and safety must be foremost in everyone’s mind. After 15 years of flights, learning has taken place, however, and a new structural relationship has been proposed in the mid-1990s as desirable and possible. Also, budget pressures have forced NASA to take a hard look at shuttle management. The key document in privatization decision-making thus far is the *Report of the Space Shuttle Management Independent Review Team* (February 1995). Chaired by Christopher Kraft, former director of the Johnson Space Center, the review team called for replacing much of NASA’s shuttle bureaucracy and many contractors with a single contractor possessing broad decision-making authority.

The report led to a decision by NASA in 1996 to negotiate a contract with a new company called United Space Alliance (USA), formed by a partnership of Rockwell International and Lockheed-Martin. It is believed that such a move would save \$1 billion annually in present shuttle costs and require far fewer employees to service shuttle operations. The actual details of what would remain governmental and what would be private are to be worked out over time. Scheduled to begin by September 1996, the transition of the shuttle from public to private would take years. Privatization of the Space Shuttle would break new ground in NASA-business relations—indeed governmental-private sector relations in general. There has been talk and some action at NASA in terms of privatization in the past, but never has an activity so central to NASA been privatized, or one so overlaid with risk to human life.

Privatization of the shuttle makes NASA a showcase for the Clinton administration’s call for “Reinventing Government.” However, the move is a controversial change in public-private relations. It entails marrying private profit, cost reduction, and public purpose in shuttle utilization. At the same time, privatization is expected to maintain a virtually perfect record in preventing loss of human life. The combination of requirements is unprecedented.

Conclusion

This essay has discussed NASA-industry-university relationships—a research partnership. The basic infrastructure for this partnership was established in the period from 1958 to 1969. Changes subsequent to this era have been variations on the models of this time

61. This information was obtained from Sylvia K. Kraemer, Office of Policy and Plans (Code Z), “Explanation of Executive Branch Policy Directives,” September 1995, copy available in NASA Historical Reference Collection.

frame, modified by the need to address funding constraints. Attempts to expand NASA's role to support private sector commercial space initiatives have had difficulties. Nonetheless, NASA overall has been an important pioneering agency in terms of industry and university relations. NASA's innovations in contracting and emphasis on spinoff technologies have been adopted by other government functionaries. NASA-university relations in the Sustaining University Program, while disappointing to Webb, were precursors of the current emphasis on government-university-industry relations today. NASA's geographical spread and institutional development policies certainly have been emulated elsewhere.

The problems in these relationships are more than balanced by their positive features. NASA's basic problem in these relationships since 1969 has been how to maintain some of their more successful features that were seen earlier in NASA's history—such as the balance between in-house capability and contractor expertise. It is easier to innovate when funds are growing rather than declining. Also, as the space program matured, it has become increasingly necessary to determine what activities must remain governmental and what can be privatized. The division of labor based on concepts of what is R&D and what is operational in space can be controversial, as the shuttle case indicates. Still, the basic infrastructure has proved itself robust and resilient. During the 1960s, NASA built a base that could last and a set of partnerships that could be renewed. The NASA-industry-university relationship today remains one of the more adaptive and important policy concepts when applied to national purposes.

Document III-1

Document title: T. Keith Glennan, Memorandum from the Administrator, "Functions and Authority—Office of Research Grants and Contracts," April 6, 1959.

Source: NASA Historical Reference Collection, NASA History Office, NASA Headquarters, Washington, DC.

When T. Keith Glennan became the NASA Administrator in the fall of 1958, just as the space agency began operations, he had the opportunity to frame relations with other federal and private organizations as he wished. Recognizing that universities held much scientific and technical expertise, he naturally sought a formal alliance that would allow a mutually beneficial relationship. Much of what he put in place was carried out by the Office of Research Grants and Contracts, the formal entity at NASA Headquarters charged with caring for this relationship. The following memorandum provides a statement of functions and authority for this office, as well as a rationale for action.

[1]

April 6, 1959

Memorandum from the Administrator

Subject: Functions and Authority—Office of Research Grants and Contracts

1. *Purpose of this Memorandum.*
 - a. To redesignate the University Research Program Office as the Office of Research Grants and Contracts.
 - b. To provide a statement of functions and authority for the office.
2. *Functions.* The Office of Research Grants and Contracts is assigned the following functions.
 - a. Developing the NASA basic research program to be conducted in educational, scientific and industrial organizations, except for research directly related to or accomplished under the Space Flight Development Program.
 - b. Assisting other offices and divisions in identifying basic research projects which justify NASA support.
 - c. Serving as NASA contact point for research scientists and administrators of other organizations concerning research grants and contracts.
 - d. Advising educational, scientific and industrial organizations of NASA basic research needs.
 - e. Providing procedures for handling all unsolicited research proposals received by NASA.
 - f. Obtaining and coordinating the review and evaluation of all research grant and contract proposals, with other interested and responsible offices and divisions.

- [2] g. Providing the Procurement and Supply Division with recommendations and necessary justifications for all research grant and contract actions.
- h. Ensuring, or providing when necessary, proper technical monitoring of sponsored research.
- i. Coordinating the sponsored basic research program with related programs of the National Science Foundation and other Government agencies.
- j. Ensuring, and assisting in, the publication of research information arising from the sponsored research program.
- k. Providing administrative services for all approved research grants and contracts, including recommending type of contracts or grant instrument forms, maintenance of official agency files and records, handling of all correspondence, receipt and processing of vouchers for payment, etc., but not including such services for industrial research sponsored with Space Flight Development funds.
3. *Reporting Responsibility.* The Chief, Office of Research Grants and Contracts reports directly to the Director, Aeronautical and Space Research.
4. *Scope of Authority.* The Chief, Office of Research Grants and Contracts is authorized and directed to take such action as is necessary to carry out the responsibilities assigned to him within the limitations of this and other official NASA issuances and communications.
5. *Limitations on Authority.* The authority of the Chief, Office of Research Grants and Contracts, does not include technical cognizance of research activities funded in the Space Flight Development Program or research conducted in NASA facilities, but does include administration of university and non-profit institution grants and contracts to ensure conformance to administrative policies and procedures.
6. *Relationships With Other NASA Officials.* In performing the functions assigned to him, the Chief, Office of Research Grants and Contracts is responsible for recognizing the delegations of authority and responsibility of other NASA officials and for seeing that instructions he may issue are properly coordinated with the offices and divisions having joint interests.

T. Keith Glennan
Administrator

Document III-2

Document title: Walter D. Sohier, NASA Assistant General Counsel, "Legal Framework of NASA's Procurement Program," *NASA-Industry Program Plans Conference, July 28, 1960* (Washington, DC: NASA, 1960), pp. 105-108.

At a first-of-its-kind NASA-industry conference in mid-1960, NASA presented its thinking regarding future spaceflight plans to the industries that would play a key role in implementing those plans. In anticipation of increased contracting with industry, NASA's Assistant General Counsel, Walter D. Sohier, provided an overview of the space agency's procurement policy. In it he emphasized the legal aspects of the procurement policy being implemented by NASA. This policy served the space agency during the earliest period of its contracting for spacecraft, ancillary components, and support infrastructure in the lunar landing program of the 1960s.

[105]

Legal Framework of NASA's Procurement Program

It is my purpose to discuss with you the legal framework of NASA's procurement program. Since many of you are familiar with the basic statutory and regulatory authority under which the procurement operations of the Military Departments function, particular emphasis will be given in this discussion to similarities and differences between the rules which we in NASA must follow and those which govern the military. The subject of NASA's statutory patent policy is presented in the paper by Mr. Gerald D. O'Brien, our Assistant General Counsel for Patent Matters, and therefore will be omitted entirely from this discussion.

The question of what statutory procurement authority to give such a new agency in order for it to be able to carry out its rather unique program within the tight schedules necessarily involved was given considerable thought during preparation and enactment of what is now the National Aeronautics and Space Act of 1958. The original bill which was submitted to Congress by the Executive Branch contained a broad grant of substantive authority for NASA to enter into such contracts or other transactions as might be necessary in the conduct of its work and on such terms as the new agency might deem appropriate. This bill also proposed making applicable to the new agency the provisions of chapter 137 of title 10 of the U.S. Code, formerly known as the Armed Services Procurement Act of 1947.

There were both history and practical reasoning behind choosing this legislative approach to NASA's procurement authority. Historically, NASA's predecessor organization, the National Advisory Committee for Aeronautics (NACA), had been included along with the military departments and the Coast Guard as an agency to which the provisions of the Armed Services Procurement Act applied. Hence, this set of rules was already familiar to NASA people. From a practical standpoint, it was felt that the research and development procurement activities of the new agency were likely to involve the same general industry as that which was engaged in military research and development programs. To require this agency to follow about the same set of procurement rules as the military followed might avoid needless confusion on the part of industry and might cut to a minimum delays created by unfamiliarity with the practices of the new agency.

Essentially, this formulation of procurement authority was in the end enacted into law [in] the Space Act by the Congress, requiring NASA to follow the same statutory rules gov-

erning procurement procedures as the military. In spite of this fact, there are a number of differences between the statutory authority available to NASA and to the military departments that have an impact on the procurement process and which will be apparent to industry in its dealings with NASA.

The first, and most serious, difference relates to NASA's lack of authority to indemnify research and development contractors against unusually hazardous risks. The military departments have had such indemnification authority since 1952, but unfortunately this authority was not extended to NASA. We have been able largely to surmount this problem where nuclear material is involved, since the Atomic Energy Commission can extend indemnification coverage under the Atomic Energy Act to NASA contractors covered by operating licenses of the AEC. There remain, however, instances of other unusually hazardous risks that are involved in the performance for work for NASA. These risks by very definition are not normally insurable unless exorbitant premiums are paid. NASA has sought to rectify this lack of authority by proposing in [106] our legislative program to Congress that NASA be given the same authority to indemnify research and development contractors as is available to the military. We have hopes that when Congress comes back next month this, along with other items of the legislative program, will get favorable action.

A second difference between the legal authority available to the military departments and to NASA that has procurement implications relates to the authority of the military to exempt foreign purchases from the payment of duty under 10 U.S.C. 2383. This statutory provision provides that the Secretary of a military department may make "emergency purchases of war material aboard." It is clearly inapplicable to NASA. The immediate practical effect of this difference in authority is obvious.

A less obvious effect arises in connection with the Buy American Act and the handling of purchases in Canada. Defense currently provides that the purchases in Canada of supplies appearing on certain departmental lists will, in effect, be exempt from the Buy American Act. Supplies purchased in Canada that do not appear on such lists are likewise exempt, except that duty will be added to the price offered by the Canadian supplier, whether or not a duty free entry certificate is provided pursuant to 10 U.S.C. 2383.

For NASA to treat certain listed supplies in the same way as the Department of Defense would mean that, in spite of the actual payment of duty, the Canadian firm would be treated as if no duty were to be paid. Thus, under such a procedure, a Canadian firm would be awarded a contract even though the ultimate cost to NASA, when duty is considered, might be considerably more than the next lower bid or proposal. The taxpayer would come out the same in the end, but NASA appropriations would suffer.

We have recently determined that because of this difference in the application of duty to purchases in Canada by NASA we cannot adopt precisely the same policy and procedures as the military in dealing with Canadian companies. Moreover, American industry will be involved in this problem since the duty situation, so far as it affects subcontractors in Canada as well as other countries, must be taken into consideration. As you can see, this is a pretty complicated subject. Suffice it to say that NASA has tried to minimize the procedural differences in this area between dealing with the military and dealing with NASA. But certain differences must remain, since our authority to exempt from duty purchases from foreign sources is not the same as that of the military.

A third difference in legal authority available to DOD and NASA has been resolved by Executive Order. At the outset, NASA was not an agency authorized by the President to include the so-called "no set-off" provision in its contracts pursuant to the Assignment of Claims Act. By Executive Order No. 10824, dated May 29, 1959, the President remedied the situation, thus placing NASA in the same position in this respect as the Department

of Defense, the Atomic Energy Commission, and the General Services Administration. Prior to the issuance of the executive order, this lack of authority of NASA had posed difficulties for contractors that were in need of financing.

An effort to eliminate a fourth difference between DOD and NASA is being made in the NASA legislative program for this year. This difference relates to the bonding requirements of the Miller Act. Under this act, the Secretaries of the military departments and of the Treasury are authorized to waive the requirements of the Miller Act in the case of cost-type contracts. NASA is not an agency to which this authority to waive has been extended.

When Title II of the First War Powers Act was in existence, this lack of authority posed no difficulty for NACA, NASA's predecessor, because Title II afforded a similar authority to waive this bonding requirement. However, with the repeal of Title II by Public Law 85-804, this failure to be specifically authorized by the Miller Act to waive bonds under cost-type contracts became significant. This was so because Public Law 85-804 clearly states that it is not to be construed as authorizing the waiver of "any bid, payment, performance, or other bond required by law."

We have had a recent contract situation arise where this has posed an awkward and, seemingly, unnecessary situation for us. It would [107] appear that the end result was never intended by the Congress, and we hope the situation will be remedied by the Congress in August by adding NASA to the agencies authorized by the Miller Act to waive bonds in cost-type contracts.

A final difference in authority, a remedy for which is also in our legislative submittal presently before the Congress, relates to our authority to outlease property. It has procurement implications to the extent we lease out industrial facilities to companies in connection with the performance of NASA contracts. The heart of this problem lies in the fact that the military departments have express statutory authority in 10 U.S.C. 2667(b)(5) to outlease property even though the consideration for such leasing is no more than maintenance of the property by the lessee. The absence of such express authority requires the charging of additional consideration. NASA has, in the Space Act, the authority to lease out property but does not have express authority to accept maintenance of the property as sole consideration. We are seeking such authority in our legislative program. Without it, NASA must treat industry differently in this respect than does the military.

I have discussed in some detail certain differences in authority which must be borne in mind in doing business with NASA as distinguished from the military departments. These are exceptions to the general rule that the rules involved in doing business with NASA are not appreciably different from doing business with the military. But I do not wish to overemphasize the differences in procurement authority between NASA and the military. Essentially, the same set of rules applies. This may be illustrated by turning briefly to a discussion of the regulations governing NASA procurement.

There are two main bodies of government Procurement Regulations at the present time—the Armed Services Procurement Regulation [ASPR], and the Federal Procurement Regulations. Generally speaking, the Federal Procurement Regulations are followed by the civilian agencies of the government, the Armed Services Procurement Regulation by the military agencies. This would seem to be a logical division, since most of the civilian agencies are governed by Title III of the Federal Property and Administrative Services Act of 1949, under which the Federal Procurement Regulations are issued, whereas the military is governed by a different statute establishing procurement procedures. The difficulty arises with respect to NASA, however, since—civilian as it is—it is governed by the same procurement law as the military departments and not the civilian agencies of the government.

Where does this lead to in terms of which procurement regulations to apply to NASA? A compromise was worked out on this question which, we feel, achieves the laudable objectives of the Federal Procurement Regulations System to eliminate the multiplicity of government procurement regulations while also achieving the objective of not requiring contractors of NASA to learn a different set of rules from those which they must follow in contracting with the military departments.

In essence, this compromise permits NASA to adopt the policies and procedures set forth in ASPR rather than in the Federal Procurement Regulations [FPR]. In practice, it seems unlikely that there will be many differences of substance between the FPR and the ASPR. If a policy or practice is not covered by the FPR, NASA will follow any existing ASPR policy or practice unless the Administrator of NASA determines that the objective of uniformity between NASA and DOD is outweighed by other considerations. Of course, in the area of patents, NASA must adopt special policies and procedures because of the unique patent provisions contained in the Space Act. It is also contemplated that, in the area of grants and contracts falling generally within the purview of Public Law 85-934, NASA will not be required to conform to any future FPR coverage on these matters.

NASA has already published a considerable portion of its procurement regulations. In the near future, the balance will be published. These will appear, as they are published, in the Federal Register as part of the FPR System. However, they will read and look very much like ASPR.

One practical effect of these arrangements concerning ASPR and the FPR and our manner of proceeding in the adoption of procurement regulations is that, when a military department is faced with administering a NASA [108] contract, it will not be unfamiliar to it. We can, in effect, tell the military: "Just follow your normal procedures for contract administration; our contracts are pretty much the same as yours." And, of course, for industry—ordinarily the same industry with which the military departments deal—a new set of rules need not be learned.

This simplifies the problems of negotiating contracts, too. If a company wants to change a NASA clause or form, the first question asked is whether a similar deviation has been granted by the military departments. If not, why is NASA any different? If so, NASA will certainly give the request careful consideration and will ordinarily grant the request.

NASA cannot afford to hash over old arguments with respect to some of the policies now set forth in ASPR and to open up these matters for extensive negotiation. If we have ideas as to changes that should be made in standard clauses or in major policies, we would prefer to work these changes out with the other government agencies as a normal course of proceeding. Of course, our special mission may give rise to the adoption of some different procurement policies and procedures in fields other than patents. In addition, it must be recognized that at the present time NASA's contracting is largely of a research and development nature: hence, it must orient its procurement methods to this fact. We do not wish to abandon flexibility where this is needed to get our special job done. But we feel that the present arrangements under applicable statutes and regulations are, in general, well suited to meet our needs. We are hopeful that the few deficiencies in authority which were noted earlier will be remedied by the Congress when it returns to finish up its work in August.

Document III-3

Document title: U.S. Congress, House, Committee on Science and Astronautics, Subcommittee on Patents and Scientific Inventions, "Property Rights in Inventions Made Under Federal Space Research Contracts," Hearings on Public Law 85-568, August 19-20, November 30, December 1-5, 1959, Report No. 47, 86th Cong., 1st sess. (Washington, DC: U.S. Government Printing Office, 1959), pp. 1-36.

Responding to a drive spearheaded by NASA Administrator T. Keith Glennan, the House of Representatives voted to amend NASA's title-oriented patent policy to reflect the Department of Defense's license policy. This legislation died, however, when the Senate failed to pass a similar version. These hearing excerpts capture the issues underpinning the patent policy question.

[1]

Property Rights in Inventions Made Under Federal Space Research Contracts

Wednesday, August 19, 1959

House of Representatives,
Subcommittee on Patents and Scientific Inventions,
Committee on Science and Astronautics,
Washington, D.C.

The subcommittee met, pursuant to call, at 10:15 a.m., in room 214-B, New House Office Building, Hon. Erwin Mitchell (Chairman of the subcommittee) presiding.

MR. MITCHELL. The subcommittee will be in order.

As the witnesses know, this is the first general session of the special Subcommittee on Patents and Scientific Inventions. I feel—and I know that the members of the subcommittee feel—that we are certainly considering a most important problem—not only one that is important currently, but which will have a great significance in the future. I think each of us feels that we can, by very slow and thorough study, possibly set a course of action in the patent field insofar as the Government is concerned.

We are certainly most privileged to have two distinguished specialists in this field to testify this morning—Mr. John A. Johnson, the General Counsel of NASA, and Mr. Gerald D. O'Brien, the Assistant General Counsel for Patent Matters, NASA.

Mr. Johnson, do you have a prepared statement?

Statement of John A. Johnson, General Counsel, National Aeronautics and Space Administration; Accompanied by Gerald D. O'Brien, Assistant General Counsel for Patent Matters, National Aeronautics and Space Administration

MR. JOHNSON. Mr. Chairmen, I do not have a prepared statement.

MR. MITCHELL. We would like you to just give us a general outline of NASA's activities insofar as patents are concerned.

MR. JOHNSON. I will be glad to, Mr. Chairman.

I should at the outset say, despite the chairman's very generous introduction, that I am not a specialist in patent matters, but Mr. O'Brien, our Assistant General Counsel for

Patent Matters, is and I would hope on more technical aspects of the patent problems that he will be our witness this morning. However, I am acquainted with and responsible to the Administrator of NASA for the patent policies of the National Aeronautics and Space Administration.

[2] As the committee knows, the National Aeronautics and Space Act of 1958 contains a section, section 305, which deals in quite elaborate detail with the subject of inventions which are made in the performance of contracts for the National Aeronautics and Space Administration.

The overall effect of section 305 is to require that such inventions become the property of the U.S. Government if they are made under the conditions specified in section 305(a) unless the Administrator of NASA determines that the public interest is better served by a waiver of rights to those inventions. In that case, however, the Government would still remain a royalty-free license to the use of the invention.

This policy which is expressed in section 305, the statutory policy, is at fundamental variance with the policy followed by the Department of Defense. It is rather similar to that followed by the Atomic Energy Commission—not identical with that, but it is quite apparent that the statute does, in its overall substance, follow the Atomic Energy Act rather than the practice of the Department of Defense.

As you know, the Department of Defense policy is one of ordinarily acquiring only a royalty-free license to inventions that are made in the course of research and development work sponsored by the Department of Defense agencies.

This policy of the Department of Defense is not the result of legislation. It is the result of policy determinations made in the executive branch of the Government, which have been well known to the legislative branch for many years and evidently acquiesced in by the Congress.

MR. MITCHELL. Mr. Johnson, just to pinpoint that, what is the underlying philosophy insofar as the NASA point of view is concerned?

Why the difference?

What is your thinking in NASA?

Why should there be the difference in the patent policy in DOD and NASA?

MR. JOHNSON. Mr. Chairman, the reason there is a difference is because the Congress so decided a year ago.

This was not the result of any determination within the agency. As a matter of fact, the agency didn't exist when Congress passed this law. Therefore, it has not been an open question for NASA as it has been for the Department of Defense.

The Department of Defense, being unhampered by legislation on this subject, has determined its policy on its own, but with congressional knowledge and acquiescence.

MR. MITCHELL. Is there any existing policy in NASA now insofar as this matter is concerned?

MR. JOHNSON. The existing policy in NASA is to do our best to implement the provisions of law passed by the Congress a year ago.

This has really been the only thing we could do, and it has been our task.

Now, if you are asking, Mr. Chairman, whether the agency has yet evolved a position on whether this legislation should be continued, this hasn't been formally developed yet. I am not really in a position to express either the agency's or the administration's point of view yet on that. It will be developed in time for the Congress to consider [3] at the next session because we are now in the process of preparing our legislative program for the next session of Congress. As you know, this must be submitted to the Bureau of the Budget. It may be transmitted to Congress only after we have the approval of the executive branch on it. I can, however, express some personal points of view on the matter, if you wish.

MR. MITCHELL. I would like for you to do so.

MR. JOHNSON. It is my own personal point of view—and I have expressed this publicly several times over the past few months—that it is undesirable for an agency such as NASA to be compelled by legislation to follow a patent policy that is fundamentally divergent from that of the Department of Defense.

Now, I say this without entering upon the question of whether it is good Government policy to take title to inventions that arise from Government-sponsored research or not. This is a question which, as you know, has been much discussed in the Congress and the legislative branch for many, many years. The Congress has never chosen to enact uniform legislation on this subject for the entire executive branch of the Government. We have some piecemeal legislation; we have legislation for the National Science Foundation; we have legislation for the TVA; we have legislation for NASA; we have legislation for the Atomic Energy Commission and probably others too. All of these are different. We have no legislation for the Department of Defense, which is the biggest agency of all spending money on research and development contracts.

What I would say is this: That, leaving aside for the moment the ultimate question of what is good Government policy as a whole, until a uniform legislative plan is devised by Congress for the entire executive branch of the Government—it is desirable that in the field of patents, as in all other legal aspects of our procurement program, we should be free to follow the Department of Defense policies.

I say that for this reason: All of our principal contracts are with the very same companies and will be with the very same companies that are principal contractors for the Department of Defense.

We are not really like the Atomic Energy Commission, which had to embark on an entirely new field of technology and where the major work was done within the Government—at least at the beginning. Here we are right in midstream as far as the whole aeronautics and space industry is concerned.

The space industry, as you know, is the aeronautics industry in transition.

MR. FULTON. I can't agree to that.

MR. MITCHELL. Mr. Fulton.

MR. FULTON. I can't have that go by unchallenged.

MR. MITCHELL. Go ahead

The record will show Mr. Fulton's objection.

MR. FULTON. Yes. I just can't have that as a general comment. I don't think you mean it.

MR. JOHNSON. Well, may I elaborate a bit on it?

MR. FULTON. Go ahead, sir.

MR. JOHNSON. At the present time the companies that have expressed the greatest interest—this applies to all parts of the country—in our leading contracts, of course, that are producing the boosters [4] for the space program are the same companies that have been in the aeronautics and missile business down through the years.

The years are of sort of recent origin because this is a fast moving industry.

There are probably some companies that may be confined solely to space business, but this is, I would say, not very much in evidence yet.

In any event, our contracting, by and large, is with the same companies that have substantial business with the Air Force and the Navy in particular, and the Army to some extent.

I might just cite.

Well, I won't mention names. That is beyond your investigation, I think, this morning.

In those cases where research and development work is involved we have had to request that our patent clauses be inserted in the contracts placed by the military departments.

This might not technically be called for by the terms of the statute because the statute speaks of contracts of the administration and I suppose it is an arguable question whether a contract placed by the Air Force with X Company at the request of NASA is a contract with the administration, but we felt, as a matter of policy, it would open the door wide to a type of evasion which the Congress certainly could not have contemplated if it were possible for NASA to place contracts through the military departments and evade section 305.

So, we have required, as a matter of policy, that our patent clauses be inserted in all of those contracts.

This means that a contract is placed by the Air Force at NASA's request for work that is substantially similar to the very work they would be placing themselves with that same company, the patent results of the first contract are essentially different from the patent results of the second contract, and yet this is the U.S. Government dealing with this company with the right hand and with the left hand. It is our feeling that this is not a good position for the Government to be in.

Now, I would like to say something more in that connection. Congress has been quite careful in every other respect in recognizing that we must do business essentially as the Department of Defense does it. NASA is the only nonmilitary agency that is under the terms of the Armed Services Procurement Act of 1947, now codified as chapter 137, title 10, of the United States Code.

NACA was under that act when it was first enacted 11 years ago. It was actually passed in 1948, I believe. Last year when the National Aeronautics and Space Act of 1958 was passed, Congress in section 301(b), specifically amended chapter 137 of title 10, which appears in that portion of the code that applies to the Defense Department, to make it applicable to NASA. This doesn't apply to the Atomic Energy Commission; it doesn't apply to the General Services Administration or any other Federal agencies of the Government. Thus, unlike all the other civilian agencies, NASA alone is under the terms of the Armed Services Procurement Act.

[5] One of the first official acts of the Administrator after NASA came into existence last fall was to announce that NASA would, insofar as practicable, follow the policies and procedures of the Armed Service Procurement Regulations, which is an elaborately developed set of regulations implementing the Armed Services Procurement Act of 1917.

We thought it would be undesirable, since Congress has determined that we should be under the same corpus of legislation, to be developing an essentially different group of regulations.

As you know, the General Services Administration has a responsibility for achieving maximum uniformity in procurement regulations in the executive branch of the Government and they recently published the Federal Procurement Regulations, or the first portions of it at least.

NASA has secured from the General Services Administration authority to deviate from the Federal Procurement Regulations. Insofar as the Armed Services Procurement Regulations are not consistent with them, we have the authority to follow the Armed Services Procurement Regulations rather than the FPR's when the Administrator determines that to be in the public interest.

There have been a number of other instances during the past year in which we have striven for legal uniformity with the Department of Defense to carry out what clearly seemed to be the intention of Congress in amending the Armed Services Procurement Act to include NASA.

We obtained by executive order the so-called Vloan authority to guarantee loans to contractors under the Defense Production Act. We obtained the authority to use what is called the no set-off clause under the Assignment of Claims Act. Both of these could be accomplished by Executive order. They were available to the Department of Defense and the President extended them to us.

We also joined with the Department of Defense in seeking identical pieces of legislation which would grant both NASA and the Department of Defense authority to indemnify contractors to a very large amount against certain extra hazardous risks involved in the kind of business they are doing for us.

One of those bills came to this committee; the other one to the Armed Services Committee. There has been no action on them at this session of Congress.

All of these actions, which we deemed to be in accordance with the intent of Congress, expressed in the portion of the act I referred to, have been designed to put us in a posture of legal equality or parity with the Department of Defense.

The one outstanding exception to that is in the field of patents and this, of course, is a field of great importance to industry.

Now, we are sort of the tail on the dog in this. Our program is not as big as the Department of Defense program; yet in the development of much of this hardware, it is quite indistinguishable so far as the technology is concerned from the kinds of things that the Department of Defense is doing.

MR. MITCHELL. If I may interrupt you at this point, I think I should state to the members of the committee the gentlemen were not requested to give any official position as far as NASA is concerned, but [6] merely to brief us on the existing law. However, I think it is most important—and I appreciate deeply, Mr. Johnson, your willingness—to give us your own personal views because that is exactly what the subcommittee wants. We want to hear opinions concerning the existing law and the operation of the law that you and Mr. O'Brien are so familiar with.

I can see, as a matter of convenience, why NASA would want to operate similarly to DOD, but, in your personal opinion, if you care to give it, is there any uniqueness about the R. & D. field so far as NASA is concerned that would cause the Government to have more interest in the result of these inventions?

Is there some difference between DOD and NASA in the R. & D. field?

MR. JOHNSON. Well, Mr. Chairman, there is a difference in the results so far as some of the ultimate product is concerned.

I would think so far as the technology is concerned and so far as the public interest is concerned that they are substantially identical. There is no significant difference.

As you know, the Department of Defense is way out in forward-looking research in space technology. It has to be because, while NASA is given a very extensive statutory responsibility by the first sections in the National Aeronautics and Space Act of 1958, section 102(b) excerpts from that and gives to the Department of Defense those activities peculiar to or primarily associated with the development of weapons systems, military operations or the defense of the United States, including the research and development necessary to make effective provision for the defense of the United States.

So far as inventions are concerned, the same kind of inventions can very well be made in the course of developing these advanced weapons systems that are utilized in space, as might be the case on the civilian side.

Now there are some uniquely civilian applications this might not be true of.

MR. MITCHELL. Any questions by any members of the committee?

MR. KING. Yes.

MR. MITCHELL. Mr. King.

MR. KING. Mr. Johnson, you expressed your opinion, unofficially, and we understand the spirit in which it was given, but I am interested in pursuing it just a bit.

Your reasoning has followed pretty much in the line that you think uniformity is a good thing inasmuch as NASA's practice, as indicated by the Congress, is not uniform and not consistent with the practice developed by the DOD: therefore, that creates an anomaly. You feel it might be well to bring the two together.

That, as I understand it, is the burden of your reasoning.

That, of course, avoids the question, the big question, which is: What is a desirable policy here?

If the NASA policy, as expressed by Congress, is inherently correct and sound and if the DOD policy, which has not received congressional approval, but has just grown up, is inherently unsound, then it seems to me the movement should be in the other direction.

Even though NASA may be the tail and the DOD is the dog, if the tail happens to be right and the dog happens to be wrong, then the movement would be in the other direction.

[7] So, I get to the more ultimate question as to what is a sound policy.

Now, that, I realize, is a tremendous question. You may not want to comment on it, but if you would like to I would be interested in hearing your comments.

MR. JOHNSON. Mr. King, I agree with your analysis entirely. That is the ultimate question.

I would rather not express an opinion on that because I am sure that we in NASA have a lot more to learn about this.

We have been in the process during the past several months of administering this just as objectively and fairly as we can, and I would like to assure the committee that I feel confident that the views I have just expressed have not impaired our objectivity in the administration of this provision of the law.

This is the ultimate question that Congress has been discussing off and on, and so has the executive branch for I don't know how many years. It would be, I think, a great public service if it could be decided wisely and finally.

I think I would rather at this stage of things simply say that until that question is settled and the Congress itself is able, through the processes you have of bringing together so many different points of view and the practices of the different agencies, to settle this thing, it is undesirable for an agency like NASA, given the kind of business we have to do, to be compelled to be essentially different from the Department of Defense.

MR. KING. Mr. Johnson, don't you feel, though, that this ultimate question is inevitably before us?

We can't evade it, and I, personally, would be most reluctant to predicate any decision of mine simply on the grounds of uniformity without coming to grips with this more ultimate question, and I haven't made up my mind on it and I don't want anything that I am saying to you to intimate that I have. I just recognize that as the ultimate problem, and I would be loath to take an action simply for the sake of uniformity if that action actually represented a step away from what I would otherwise consider to be the more desirable objective.

So, my comment is this: Don't you feel that this subcommittee still must face this ultimate question and predicate its action on the basis of the ultimate question rather than on the basis of uniformity alone?

MR. JOHNSON. I'm sure that the committee can't avoid facing the ultimate question.

I do think, though—and I suppose maybe I must differ with you fundamentally on this—that a problem like this can't be settled with some reasonable degree of uniformity, here is an area where equal treatment by Government agencies is a principal that is perhaps even paramount to the question that you are concerned with. I don't mean by

this you have to, say bring TVA into this picture, but you have here two agencies, NASA and the Department of Defense, that are doing a very similar kind of business with a similar segment of U.S. industry.

I don't think that you will find that this is a question that lends itself to a very clear black and white solution.

The very fact that Congress, itself, has dealt with it in such a variety of ways before, and the fact that it is argued by people who [8] have spent their lives in the patent field without clear-cut answers, I think would indicate that there is probably a lot to be said on both sides of the question, so that I don't think you would be committing a really gross error by at least achieving uniformity before you have solved the ultimate problem.

I think there is something essentially wrong with the U.S. Government, which, after all, is one legal person, dealing with a company through two different agencies on essentially the same kind of contracts and taking an invention with one hand and leaving it there with the other, or say, two different companies—one that happens to be only contracting with NASA at that time and the other one with the Department of Defense, but on essentially similar kinds of business and involving inventions that are in the same field of technology.

I think equality is still the basic principle of equity; and it is more desirable here to have equality of treatment than it is to perpetuate inequality for fear you might depart temporarily from what would appear ultimately to be the best principle.

MR. DADDARIO. Will the gentleman yield?

MR. KING. Yes.

MR. DADDARIO. If that is so and you feel there should be this equality, why is it that you put a limitation on some of these departments, which are not under this restriction, when they make contracts in behalf of NASA, that [th]is patent infringement type of restriction should apply?

MR. JOHNSON. Mr. Daddario, as I said before, we are administrating this law as objectively as we can without regard to the personal opinions that I have been asked to express here this morning. As we see the law, it could not be intended that NASA, simply by placing an order with the Defense Department rather than entering into a contract with X Company directly, would cause an arbitrary difference in patent results.

We know that when Congress writes a law, even as complicated as this, they can't say everything, and we have to try to determine what the intent of Congress was.

We read in section 305(b):

"Each contract entered into by the Administrator with any party for the performance of any work shall contain effective provisions——"
and so forth.

This is the basis for our patent clauses.

It was our conclusion that Congress must have intended that when any work is placed as a result of a NASA requirement by the Government it is within the intention of Congress that the patent provisions of section 305 apply.

You wouldn't get uniformity, anyway, because you would still have the NASA contracts as distinguished from the DOD contracts. So, you are already faced with the lack of uniformity. You have the contracts placed directly by NASA. You have the contracts placed directly by the Defense Department for its own business. Those are already nonuniform by virtue of the legislation.

Now, you have this intermediate category of contracts placed by the Defense Department at the request of NASA with our funds and for our proposes, and this is the question: Should we throw these into the pot with the Defense Department contracts or should [we] throw them into the pot with our contracts?

[9] We felt that if we didn't throw them into the pot with our contracts this would be just an open-sesame to an evasion of the patent requirements of section 305.

MR. DADDARIO. In some cases you have departments which enter into contracts for the benefit of NASA without necessarily utilizing funds obligated to NASA. They are essentially using their own funds.

Isn't that so?

Mr. JOHNSON. There is—yes—a small amount of that.

I don't know of any new contracts of that kind being placed.

MR. O'BRIEN. No.

MR. JOHNSON. I think all of our new business—you see, we have a certain number of contracts that were commenced originally by the Defense Department. We had an executive order last October transferring a number of projects from the Air Force and from ARPA, and also the Vanguard project from the Navy Department, as an example.

Now, in the case of those projects, contracts were already in existence and we have taken them over. That is a case where we clearly didn't feel it would be legally proper for us to amend the contract to change the patent situation, because if a contract means anything at all it means what it says when the contractor signs it.

At the present time I don't know of any cases where other Government agencies are continuing to place contracts with their own funds for our benefit.

MR. DADDARIO. That is all.

Thank you.

MR. KING. Mr. Chairman, I don't want to belabor this, but I would like to say for the record I think we would be derelict in our duty as a subcommittee if we did not consider the problem of uniformity in the context of the larger problem; that is, whether or not the Government's retaining patents is inherently a good policy or a bad policy.

I feel that that problem is before us, and I just wanted to state that for the record.

MR. MITCHELL. Thank you, Mr. King.

I think you have stated the purpose of the creation of this subcommittee, and that is the problem that we are going to look to.

Mr. Bass, I am going to recognize you, but I have just one question first.

What difficulty, if any, have you encountered as a result of the wording in the NASA Act and the difference in the policy of DOD?

Has it concerned you or made it more difficult to obtain contracts?

MR. JOHNSON. This is a difficult question, Mr. Congressman, to answer categorically.

We have had a number of contractors express reluctance at first to enter into contracts with us and have even requested additional compensation because of the loss of what would otherwise be their patent rights.

I think that in every case, even though it has taken time, we have negotiated this problem successfully and have not, I believe, to date been faced with a known situation of unwillingness to do business with NASA.

We have also taken a firm stand against any additional compensation for the loss of what they regard as their patent rights, but which we [10] regard under the terms of the law as the patent rights of the United States.

On the other hand, we have had a number of reports—these, I should say, are unauthenticated and it is not the kind of thing we can trace down easily—of companies that have put out the word to their own personnel that they will not accept any work for NASA; they will not do any work either as a prime contractor or a subcontractor which involves the loss of patent rights which they would otherwise retain if they were doing business for the Department of Defense.

Now, it is very difficult to know the extent of that because when we put out requests for proposals we don't know whether a company that doesn't respond is not responding for that reason or for some other reason.

Also, when you get down to the subcontractor level, in the lower tiers, this is something which some of our prime contractors might know more about than we do; but we have had information to that effect.

Perhaps Mr. O'Brien could be more specific on this.

MR. O'BRIEN. No; I don't think I could add very much to that, Mr. Johnson. I think that is the extent of my information.

MR. JOHNSON. We have to recognize, too, that we have been only in the beginning phase of this thing. It takes quite a long while for the impact of these things really to be felt.

We have been in the beginning stage of our contracting program, and the whole NASA program is still pretty young.

So far I don't believe we have had yet the first report, have we, of an invention made in the performance of one of our contracts?

MR. O'BRIEN. No.

MR. JOHNSON. The ultimate—

MR. MITCHELL. In negotiating these contracts if I may interrupt, have you had indication, without going into specifics, that if the contractor had the patent right this contract could be let less cheaply to the Government?

Have they indicated that, knowing the existing law and knowing it could be done?

Has there been some such indication when you negotiate on these contracts?

MR. JOHNSON. There have been some indications of contractors that wanted extra compensation for this thing, but it has been refused and they have taken the contract.

The answer is that, from my personal knowledge—and, of course, there are many of these that I have not had personal knowledge of—I don't know of that kind of case.

MR. MITCHELL. Mr. O'Brien.

MR. O'BRIEN. I know of none where they have placed a premium or said they would do it for a lesser amount if the patent provisions of their contract were similar to the Department of Defense patent provisions.

I only have the instances where they had tried to make additional charges for taking the patent rights provisions of the NASA patent clauses, and this was not permitted and they didn't take the contract with the original pricing.

MR. MITCHELL. Mr. Bass.

[11] MR. BASS. Then, Mr. Johnson, I assume you base your feeling in regard to this question primarily on the grounds of equity and what is fair rather than on any matter of impeding or hindering the defense effort because of this unequal treatment?

MR. JOHNSON. I do base it on that, Mr. Bass, primarily.

I think, too, with reference to Mr. King's comments, I am looking at this mainly as a lawyer rather than as a person concerned, as the committee has to be, with the ultimate question of Government policy. I think that, as a lawyer, in the negotiation of contracts with industry, it is basically unfair for two Government agencies, both representing, after all, the same U.S. Government, to be dealing in essentially different ways on a matter of this importance with the same contractors or with two contractors similarly situated.

MR. KING. Would the gentleman yield at that point of one question?

MR. BASS. Yes.

MR. KING. Right in connection with that, Mr. Johnson, do you not feel that the waiver provisions in the law allowing the Administrator to waive them under certain circumstances—that if he exercised that rather liberally, that that might not bring about the uniformity that you desire?

MR. JOHNSON. From the strictly legal point, Mr. King, the waiver provisions could be exercised to achieve absolute uniformity, but that would only be, I think, by disregarding the main intent of Congress in enacting section 305.

I mean by that it would be necessary for the Administrator to adopt almost a policy of automatic waiver in every case, because typically the Department of Defense does not acquire title to inventions.

Of course, this is what industry would like to have us do. It has been proposed to us. This is only natural. They would say, "Why don't you just utilize this very extensive authority granted here and, if you think uniformity is desirable, announce a policy of automatic waiver in almost every case?"

It certainly doesn't seem to us that Congress could have taken the trouble to enact a provision as elaborate and detailed as this is and expect that to be the result.

We haven't gone into our waiver regulations at this hearing today. We do have interim waiver regulations out and, while we think they are reasonably liberal, they don't begin to go that far.

MR. BASS. Mr. Johnson, you pointed out a little earlier in your testimony that in the Atomic Energy Commission they are governed by the same policy as NASA.

Is that not correct?

MR. JOHNSON. Not precisely, but more like ours than like the Department of Defense.

MR. BASS. And you justified that on the ground that in the atomic energy field this was a brand new field and, therefore, perhaps there was no inequity involved; is that right?

MR. JOHNSON. Mr. Bass, I was simply explaining the difference between AEC and NASA. I don't want to be in the position of justifying that legislation either. I don't know enough about the atomic energy business. I do know, I think, enough about it to know that it is quite different from our business.

[12] MR. BASS. I always thought of your business as pretty much pioneering, too.

That is the point I am coming to.

MR. JOHNSON. Mr. Bass, here, I think, is the reason we have section 305 in the act if I can speculate a little bit, because, as you know, this is a rather unique piece of legislation and has no significant legislative history behind it that we can read in the reports and the debates of Congress. In the establishment of a new civilian agency to carry on a very forward-looking program of research and development and a new and expanding technology, it must have seemed that the Atomic Energy Commission was the best precedent, the most analogous field of Government activity. But I think when you look at the kind of technology we are involved in, the kinds of contracts we are making, the very fact that most of the business we initially have had was transferred to us from the Defense Department, we must conclude that while we are out in a very forward field of technology, it is a field that has been in process of development a long, long time. You can't just drive a sharp line between space technology and missile technology and between missile technology and aeronautical technology.

It is a field in which the Department of Defense has already had a long and well-understood patent practice, which the Congress has at least acquiesced in, because it has been well known and is one of the big features of our economy.

I think the atomic energy field is quite different. It was developed originally as what you might call a Government-housed effort through the Manhattan project. This was done in large Government laboratories and installations segregated from private industry. We have a rule of Government monopoly in that field that pervades the whole thing which we don't have in the space and aeronautical field. We must not forget either that this agency is the National Aeronautics and Space Administration and the act is the National

Aeronautics and Space Act. It isn't just space technology we are talking about. This is the National Aeronautics and Space Act of 1958, and this section 305 isn't confined to space technology either. It applies to the whole field of activity of NASA.

MR. BASS. Now, for instance if I may interrupt, we are in the process of developing the nuclear-powered engine. Is that done by the Atomic Energy Commission or us?

MR. JOHNSON. We are participating in this.

I don't know how much—

MR. O'BRIEN. Yes.

MR. BASS. I was wondering—

MR. JOHNSON. I am not technically equipped to describe the division of effort between NASA and AEC on that sort of thing.

MR. FULTON. We have the Rover program.

MR. O'BRIEN. Under the Rover program funds are transferred to AEC.

MR. FULTON. If I may comment on that, under Rickover, of course, the AEC has the atomic nuclear engine and we have it under NASA under the Rover and other allied projects. There is a lapover.

MR. JOHNSON. In that area I know that Mr. O'Brien has worked out some patent procedures with the Atomic Energy Commission's patent counsel. Perhaps you would like to have him explain those.

MR. BASS. Yes; I would like to have him explain that.

[13] MR. O'BRIEN. In connection with Project Rover, the funds were transferred from NASA to the Atomic Energy Commission, which placed the contract with North American, and in this contract we had both the Atomic Energy Act of 1954 and the National Aeronautics and Space Act of 1958 to consider. The contract terms provide that the inventions which emanate from the research work undertaken pursuant to that contract will be subject to both acts and, without going into any details of the patent article which was included in that contract, it does attempt—and we hope it achieves that purpose—to make the inventions which were made in carrying out the research under that contract subject to both acts.

That is about the gist of the situation, I would think.

MR. BASS. One final question: If this committee and the Congress should decide it would be better to change the patent policy with regard to NASA, would we not be forced into applying the same rules with respect to the patents of the Atomic Energy Commission?

MR. JOHNSON. Mr. Bass, I don't think so at all because they don't have the same situation of relative uniformity in all these other respects with the Department of Defense that we have.

Congress, as I have mentioned before, has already decided that in the field of general procurement regulations NASA is to follow the Department of Defense.

This decision was made last year.

No similar decision has ever been made with the Atomic Energy Commission.

It has been a unique operation from the beginning.

So, whereas NASA is a separate agency, it doesn't have the same kind of uniqueness in its manner of doing business. Congress has recognized that in the legal field it is desirable for us to be as uniform with the Department of Defense as possible.

MR. BASS. Thank you.

I have no further questions.

MR. MITCHELL. Mr. Fulton.

MR. FULTON. We are glad to have you here, and I would like to go over this field rather widely so that we can check into and see what the problems are, and I would say to

you, rather than have some of the answers directly today, I would rather have you give it some more thought, because I have been a member of the previous select committee and was on the committee at the time of the conference report, and I was also one of the conferees when the patent provision was put in

The question first comes up in this field, as it does in any field: What are the limits that we are talking about?

For example, are we going to talk simply about patents in space?

Are we going to talk about them in the field of aeronautics?

Are we going to talk about them in both fields?

For my part, I could see there would be a distinction between the patents fields in aeronautics and in space. One, the aeronautics field, has been developed under the National Advisory Committee for Aeronautics over a period of time under established principles. The other is an entirely new field.

Now, would you agree with that?

Would you agree that you could have a distinction between aeronautics' patents and space patents?

[14] Then I have some other distinctions I would like to make.

The question is: In your mind, must the aeronautics field always apply to space in the patent field?

I don't think they should.

MR. JOHNSON. I agree, Mr. Fulton, there can be a distinction between patents in the field of aeronautics and space.

I would like to define "space" rather restrictively in that connection if I could, and recite the fact that we have already made this distinction in our waiver regulations.

As you know, the law doesn't make any distinction between aeronautics and space.

MR. FULTON. I am going to point out the defects in the law, as I see it.

MR. JOHNSON. Yes.

MR. FULTON. Likewise, I am going to point out the defect, possibly, in not distinguishing between research and development contracts as regards patents and ordinary supply contracts either in space or aeronautics.

MR. JOHNSON. We made the distinction also.

MR. FULTON. You see, our section we made in the previous select committee just applies across the field in aeronautics and space as well as on every type of contract.

Isn't that right?

MR. JOHNSON. That is correct.

I feel I must say a few words in self defense at this point because—

MR. FULTON. No. I am just inquiring. I am not criticizing you.

MR. JOHNSON. May I say something in explanation?

We did make that distinction. We have made it administratively—and we were without any published legislative history on this to help us—because we simply could not believe, in the context of this section, that every time we entered into a contract for the supply of some office supplies or something of that kind it was intended that this kind of patent clause should go into it. We have confined the use of the patent clause to—we have a rather elaborate formula in our regulations; but, to oversimplify it, it is basically a research and development type contract. We felt, after all, that this is the only reasonable intention we could read into this section of the law; but the language is so broad that some of the initial commentators on this section made it appear more horrible than it actually is in practice.

MR. FULTON. The point I am making is: The law is too broad, and in that connection I disagree with it and believe it should be more carefully written, so that, as a matter

of fact, I would compliment the NASA, the Administrator, and the people who have been advising him on making the distinction as to the type of contract that the patent provisions apply to.

Of course, when you come to a situation where there is a Defense Department type of contract, the Defense Department for years has had the provision that the particular person, the inventor, or the company with the contract has the exclusive right to the patent, subject to a free license or, rather, a free use by the Government, unless the inventor or the particular person who made the discovery is an employee of the Government. [15] Now, that brings me to the next question: Should we not have a distinction under the patent provisions of the NASA law as between the contractors and the employees?

I would say to you I see no particular reason why there should be a difference as to employees in this connection, Government employees in this connection, especially when we have the Executive Order 10096 of 1950 covering all Government employees.

When there has been such an Executive order and we have the Government Patent Board, why do we make a distinction in this particular act?

I think the act might be deficient in that regard.

What do you think?

MR. JOHNSON. Mr. Fulton, we have taken the position that section 305(a) does not apply to our employees, but that they are still under Executive Order 10096—

MR. FULTON. I think that is fine.

MR. JOHNSON (continuing). Because it says:

“Whenever any invention is made in the performance of any work under any contract of the administration. . .”

The term “contract” is a broad one, and I admit it would be arguable to construe it so broadly as to include our employment contract with our own employees. But in view of the fact the Congress has, for example, in its TVA legislation dealt specifically with employees, we couldn’t believe it was intended to work a distinction between the NASA employees and, say, the employees of the Department of Defense in view of Executive Order 10096.

MR. FULTON. But you specifically limit yourself to the determination of what the Chairman of the Government Patent Board has decided and the decisions of that Board, and under no circumstances do you go outside that and try to apply direct court decisions?

You are restrained administratively, are you not?

MR. JOHNSON. Right.

MR. FULTON. I will ask the other gentleman that question.

MR. O’Brien. Yes; this is true, Mr. Fulton. We are bound by the decisions of the Government Patent Board.

MR. FULTON. So, the particular agency of the Government—and you are representing NASA here—makes its own determination and then forwards that determination to the Chairman of the Government Patent Board for his decision to see if it is right, doesn’t it?

MR. O’BRIEN. This is correct, sir.

MR. FULTON. But even there the Chairman doesn’t decide whether the inventor is entitled to the invention unless the inventor, himself, appeals; isn’t that correct?

MR. O’BRIEN. The Chairman of the Government—

MR. FULTON. The particular person aggrieved must appeal?

MR. O’BRIEN. The Chairman of the Government Patent Board has the inherent right to either agree or disagree with the initial determination of the agency, but—

MR. FULTON. Yes; but he doesn’t review the particular ownership of the patent unless the inventor, himself, appeals; isn’t that right?

MR. O'BRIEN. He may review the initial determination; yes.

[16] I can't agree with you, Mr. Fulton.

I think he may review the initial determination.

MR. FULTON. That is the practice.

I am trying to get the practice.

MR. O'BRIEN. Oh, yes; I think this is generally true.

MR. FULTON. As a matter of fact, when it comes to the Chairman of the Government Patent Board, he then is the one who construes this Executive Order 10096 of 1950 in accordance with the court decisions and not particularly in reference to its strict legal language.

MR. O'BRIEN. That is correct.

MR. FULTON. Isn't that correct?

MR. O'BRIEN. That is correct.

MR. FULTON. So that you have to go through this system to get a determination?

Is that not the case?

MR. O'BRIEN. That is true.

MR. FULTON. Let's go a little bit further. Let's look particularly to section 203(b)(3), where it says "to acquire (by purchase, lease, condemnation, or otherwise), construct, improve," and so on, and then, in the same sentence, includes "such other real and personal property (including patents)," and then it gives the right "to sell and otherwise dispose of real and personal property (including patents and rights thereunder). . . ."

Actually, to me, that portion of the section referring to condemnation is completely unnecessary in this provision because we have other provisions that will take care of it.

Is that not right?

MR. O'BRIEN. With respect to patents, I believe this is true.

MR. FULTON. With respect to patents.

MR. O'BRIEN. I don't know about other properties.

MR. JOHNSON. We wouldn't want to delete that wording because it applies to other things.

MR. O'BRIEN. A lot of other property.

MR. FULTON. Yes; but I am referring only to patents—

MR. O'BRIEN. I agree.

MR. FULTON. And I think we should exclude the wording in that section applying to patents because under title 48 of the United States Code there is also the provision that takes care of that administrative authority for patents.

MR. JOHNSON. This will simply not be used.

MR. FULTON. My point is: it is overlapping and redundant in respect to patents. So, the act is poorly written in that regard in that particular section.

Is that not right?

MR. O'BRIEN. I agree.

MR. FULTON. I would say when no condemnation is necessary, because the Administrator can acquire the use of any patents there existing upon payment of reasonable compensation to the patentee, it would then further cloud the title of anybody and make it harder for the individual patentee.

Is that not right?

MR. O'BRIEN. It would be if the authority were so exercised.

[17] MR. JOHNSON. I think it would be just inconceivable this authority would be exercised.

MR. FULTON. Why shouldn't we have a provision that gives to the inventor or the company that hires him the exclusive right to the ownership of the patent in commercial situations that have no direct relation either to military or security uses?

MR. JOHNSON. I think several of your questions have come pretty close to the waiver regulations we have developed under the present law.

MR. FULTON. Yes; that is correct, but I am trying to set what the law should be changed to because actually your regulations are based upon what the legislative intent of Congress must have been without any hearings on the patent provision and no legislative history.

Is that not correct?

MR. JOHNSON. Well, of course, the law itself gives us considerable discretion. So we haven't really had to justify everything in terms of what Congress might have foreseen.

We felt that congress certainly expected the Administrator to use his best judgment, but at the same time you are quite right in saying that we have had to sort of look in the dark here in trying to stay consistent with what Congress must have intended.

We have tried to do that.

MR. FULTON. Then where supply contracts are concerned and there is either background information, trade secrets, or previous patent rights—in that case, it would seem to me this particular NASA Act of 1958 is burdensome and restrictive.

You see, it doesn't give credit to the company which has a patent and experience built up in a particular field; does it?

MR. O'BRIEN. I don't know that I exactly follow you, Mr. Fulton.

MR. FULTON. Here is the point—

MR. O'BRIEN. I don't think we acquire rights under background patents.

MR. FULTON. Suppose some person, some inventor, or some company has the background information, the trade secrets and previous patent rights in a particular field; the question is: Should these all be made available to the Government without reasonable compensation?

MR. O'BRIEN. They should not and they are not under the act.

MR. FULTON. Secondly, when there is a new patent or patent in that field or a substantial discovery that would require the company to disclose these or make them available to the Government, does the mere fact of an additional discovery in the field require them to come up with all this other background, patent and trade information?

MR. O'BRIEN. Certainly not with respect to background patents. There is some question about the acquisition of technical data in order to practice the invention which is made under a contract with NASA.

MR. FULTON. That is the question I am raising, and I wish you would submit some sort of statement on it to get the line of demarcation as to where that might be.

(The information requested is as follows:)

The first question concerns the issue of whether or not the operation of section 305 of the National Aeronautics and Space Act of 1958 is burdensome or restrictive upon contractors with respect to the Government's acquisition of background patents or trade secrets.

[18] *With regard to background patents, the NASA Patent Regulations, subpart A (24 F.R. 3575), specifically states that it is the policy of the National Aeronautics and Space Administration to pay reasonable compensation for the acquisition of "rights in background patents" and that the same will be acquired only by "specific negotiation," not by the automatic operation of the contract clauses used to implement section 305 of the act.*

To the same effect, the special NASA "property rights in inventions" clause, which appears as appendix IX-A in these regulations, also provides in paragraph (g)(i) that any license granted to the Government does not imply the granting of any license under any dominating "background" patent.

Accordingly (excluding those inventions made by Government employees), NASA does not acquire, except by direct purchase, any rights in an invention that has been reduced to practice prior to and independently of a NASA contract.

With regard to trade secrets as they may be involved in normal patent acquisition, the special NASA "property rights in inventions" clause, referred to above, requires that the contractor shall furnish to the contracting officer a written report containing full and complete technical information concerning any invention made in the performance of any work under the contract. Compliance with this clause may require the contractor to reveal background technical information of a proprietary nature. Ordinarily, however, the type of information required for the preparation of a patent application is not that type of "background information" which would be susceptible to protection as a trade secret. Moreover, the NASA Patent Regulations, subpart A, paragraph 1201, 101 3(b), states that the contractor may initially furnish to the contracting officer only such technical information as may be required for the purpose of identifying an invention made by the contractor and in determining its utility in the conduct of aeronautical and space activities. When requested by the contracting officer, the contractor shall, however, prepare and furnish such additional technical descriptions of the invention as will be adequate for ready transposition to patent specification form and for effective prosecution of the patent application.

With regard to the matter of acquiring trade secrets directly, NASA's practice is like that of the Department of Defense concerning the acquisition of technical data and of rights in technical data. In those NASA contracts which have as one of their purposes the performance of technical or scientific work directed toward the development of models of equipment or practical processes, NASA requires that there be delivered such technical information as may be necessary for the manufacture of the equipment or the performance of the process. To this end NASA has adopted the data clauses as set forth in sections 9-203.1 and 9-203.4 of the Armed Services Procurement Regulation.

MR. FULTON. I think that is a defect of the act at present. With respect to research and development, I think, we could make a distinction there on that type of contract because generally industry is willing to give the background information, especially when it is for a military or security purpose.

Is that not right?

MR. O'BRIEN. Generally, I think so.

MR. FULTON. All right. Then let me disagree with the former gentleman here a little bit.

When you were speaking, I was making some notes.

You had spoken of this being the creation of a civilian agency and remarked that this was a new field of patent law that is being developed for a civilian agency when, as a matter of fact, under the Department of Defense the provisions for patents were otherwise.

I would like to point out to you in the TVA Act of 1933, under 16 United States Code, as well as in the National Science Foundation Act of 1950, there were two civilian agencies created, each of which had patent provisions different from the Department of Defense.

At the time this act of 1958 that we are speaking of for NASA was passed, we were within the emergency conditions, which may now be forgotten, of the first orbit of the sputnik. Secondly, no one then [19] knew as much about space as we do now and we thought that it was a new field, that it was much over and beyond anything that was then covered by the National Advisory Committee for Aeronautics.

I say in that connection, as a member of the former Space Committee, that is why the National Advisory Committee for Aeronautics was not just continued and the space put as a subdivision under that particular body, but the whole new concept was set up that it was to be the NASA rather than the NACA.

One of the great differences between Dr. Dryden and myself—I will speak for myself, although I know that Mr. McCormack felt a little bit along the same lines that I did—was that, as it was discussed so many times in the bearing before the select committee, space was just a buildup of aeronautics. Now, our feeling was that it was a new field and should

be treated as such; secondly, that it had a good bit of the security requirements of the Atomic Energy Act because at that time we thought that either the sputnik or a space platform could cause us to lose everything we had. Under those circumstances, we wanted no one company to find and get the key to space and then everybody else in the country or the Government have to go through that one particular source in the approach to space.

So, I think you should take that philosophic background into account when we are now, at a later time, looking at the past history. For example, I had written down here my recollection that the inventions or discoveries of any employee of the U.S. Government or by any employee of the TVA corporation, together with any patents on those discoveries, are the sole and exclusive property of the corporation and the corporation is authorized to give licenses to various people.

MR. JOHNSON. May I comment on that?

MR. FULTON. That is the provision of the TVA Act, as I recall it, in 1933, so that we do have a precedent for NASA.

MR. JOHNSON. I would like to comment on that, Mr. Fulton.

That provision you refer to applies to TVA research by its own employees.

As I recall the report rendered by the Senate Judiciary Committee earlier this year on the TVA patent practices, they had acquired no patents as a result of Government-sponsored research with private industry.

As we said before, section 305 does not apply to NASA employees. It applies solely, on the other hand, to Government-sponsored research in private industries, and TVA is not a precedent for this situation at all. The TVA situation is taken care of under Executive Order 10096, which imposes a certain regime on it. TVA is different from other Government departments, but it is not a precedent for this kind of treatment of contractors.

The National Science Foundation, on the other hand, is not a precedent either because there the legislative provision merely is that the Foundation shall take such interest in patents as the public interest requires and, as you know, the National Science Foundation has followed the same practice as the Department of Defense in requiring only a royalty-free license.

MR. FULTON. As I recall it, the National Science Foundation provision requires that the contracts shall contain provisions regarding [20] the disposition of inventions produced under those contracts in a manner calculated to protect the public interest.

MR. JOHNSON. That is correct.

MR. FULTON. And the discoveries and patents must be directly related to the subject matter of the contract, and in the case of either the contractor or the inventor being an employee it must be directly in connection with the assigned duties or the purpose of the contract.

Is that not right?

MR. O'BRIEN. Yes.

MR. JOHNSON. But the legislative provision does not say anything about the taking of title to those inventions being the rule in the case of the National Science Foundation. In carrying out that particular provision of law the National Science Foundation ordinarily does the same thing as the Department of Defense does and only acquires a royalty-free license.

MR. FULTON. Yes, but don't you think when there is a specific legislative provision under the National Science Foundation Act of 1950 that the contracts that are let shall contain provisions governing the disposition of inventions produced under the contracts in a manner calculated to protect the public interest that that certainly is a provision relating to the title and use and licensing of the patents?

MR. JOHNSON. It relates to that subject matter, but it doesn't require the Government to take title to the patents, by any means.

MR. FULTON. No, but it certainly governs—

MR. JOHNSON. If it does, the National Science Foundation has been in gross disregard of the law for a number of years.

MR. FULTON. No, but it certainly limits the use of the patents, doesn't it?

Doesn't it limit the use, because every contract that is made with the National Science Foundation has to have these provisions in it that they are to be handled in a manner calculated to protect the public interest?

MR. O'BRIEN. It seems to me it would certainly lead to some interest of the Government or some governmental interest being acquired, but—

MR. FULTON. So, it is an extension in the act of NASA, but it is not contrary to those other two agencies and some of their actions.

I think it is certainly a like comparison to compare these two previous civilian agencies—one, the TVA in 1933 and the other the National Science Foundation Act of 1950, as well as the Atomic Energy Act.

Now, let us look at that for a minute. The Atomic Energy Act has been changed by the act of 1954. Would you please comment on what you think of the present state of the art in the Atomic Energy Act with the amendment of 1954 put in?

MR. JOHNSON. I am not competent to do that at all.

MR. FULTON. Would you please state that—

MR. JOHNSON. I know the Atomic Energy Commission has had testimony recently before the Joint Committee, but I don't feel competent to talk on that.

MR. FULTON. I believe they appeared before subcommittee of the Judiciary Committee as well.

If you will give us a short statement on that, I would like to have that.

[21] (The information requested is as follows:)

The question raised by Congressman Fulton concerns the statutory concept of aeronautical and space activities as it is used in section 305(c) of the National Aeronautics and Space Act.

Section 305(c) imposes a responsibility upon the Commissioner of Patents to determine which applications for patents disclose inventions having significant utility in the conduct of aeronautical and space activities. It was suggested by Mr. Fulton that the concept is too broad and that it does not permit a distinction between the field of governmental interests and the field of private interests regarding the area in which patents may not be issued without first having the applicant submit written statements of the circumstances under which the invention was made. It was suggested that the responsibility of the Commissioner should be delimited and proposals for doing so were requested.

It appears that the foregoing objective could be effected by statutory language basing the selection criterion to be used by the Commissioner of Patents on the concept expressed in the NASA Patent Waiver Regulations, subpart I (24 F.R. 8788), of inventions—

(1) primarily adapted for and especially useful in the development and operation of vehicles, manned or unmanned, capable of sustained flight without support from or dependence upon the atmosphere, or

(2) of basic importance in continued research toward the solution of problems of sustained flight without support from or dependence upon the atmosphere.

MR. FULTON. Could we make a distinction, then, between patents that are not being used for what we would call the welfare of the Government?

Suppose you had a patent discovery where its prime importance or effect was relating to the welfare of our Government or some important governmental functions; would you

make some distinction there in trying to eliminate and put into the private field such patents?

Would it not have that effect?

MR. JOHNSON. I didn't hear the last.

MR. FULTON. For example—I will simplify it—to protect private industry in the private field, where there are nongovernment usages chiefly.

MR. O'BRIEN. Yes. I think that we have tried to make such distinctions in patentable inventions in our waiver regulations.

We have tried to reserve an entire area of patentable inventions, with respect to which no waiver would generally be granted, as those inventions which become perhaps associated with the public interest, so that it wouldn't be to the public benefit to grant rights in these inventions, inventions used almost exclusively in outer space, solar sails, or something of that character, because to grant rights in these inventions or patents on these inventions might carry the inference that private industry or private parties were authorized to go into outer space under no governmental regulation.

We have also in our waiver regulations identified a class of inventions as those inventions which have predominant commercial utility and only incidental utility in space and aeronautics.

MR. FULTON. Yes. Now, there is a comment there—

MR. O'BRIEN. As to this type of invention, we are granting or proposing to the Administrator to grant waiver of rights so that the contractor who made these inventions can exploit the invention to the public benefit, to bring these inventions into the hands of the public and to use the patent for that purpose.

MR. FULTON. So, my comment is: Section 103, when it makes the definitions that are very broad covering both equipment that is usable [22] and possible exclusively in outer space, as well as commercial-type equipment, is, therefore, too broad in its coverage and should be changed.

So, I would make a change in the definitions in section 103 to make the field of private enterprise larger and to protect what we in Government are deeply interested in, that is, the things that are related to Government uses, exclusive outer space uses or weapon purposes.

What do you think of that?

To summarize, that is to change the definitions and restrict them in section 103.

MR. O'BRIEN. Well, I think the definition of aeronautical and space activities, as set forth in section 103, is broad and probably could be more carefully defined.

I haven't given much thought to that, Mr. Fulton.

MR. FULTON. Would you look into that and submit us some sort of recommendation along the lines I have been trying to point up here?

I would rather not do it here because the time is running out.

MR. JOHNSON. That definition, Mr. Fulton, is only of significance in connection with section 305(c) insofar as patent matters are concerned.

MR. FULTON. That is correct.

MR. JOHNSON. That is where the term appears.

MR. FULTON. It has to be taken in connection with section 305(c).

Just one more point and I am through.

I was just trying to think back.

The question comes up of the development of the space field in relation to time. I can see that when we were passing and preparing for the passage of the act of 1958 we were under emergency conditions. The question now occurs: Are we in the same emergency conditions in space and are we in the same relative place where we have such a lack of

knowledge that we have to keep the field open and, therefore, have a larger Government interest in these patents or has the time come where we now see more about the field and we should, therefore, say, as I would recommend, that the field of private enterprise and individual initiative and private rights should be more stressed?

Would you comment on that?

Where are we in point of time in relation to a transition period that is different from the Atomic Energy Commission in its development?

MR. JOHNSON. Well, I think we are in a substantially different position than we were a year ago.

I know our Administrator has made several statements to that effect—that we are able to shake down, in a sense, into a more orderly program and know where we are going and the worthwhileness of the things we are doing in a much better way than we were a year ago when it was necessary to try to do everything at once.

I don't think that I can compare this very profitably, Mr. Fulton, with the Atomic Energy Commission.

MR. FULTON. As you remember, the patent section of the American Bar Association at its 1956 meeting had recommended the repeal of the provisions of the Atomic Energy Commission patent sections.

They wanted them repealed.

They haven't taken any action since.

Then at their 1958 meeting they recommended the outright repeal of the patent sections of the NASA Act.

[23] To me, that probably goes too far and my disposition would be to try to go over it, as we are today, and pick out the places where the language is too broad and the provisions cover more than we intended because at the time we passed it, at that stage of the act, we couldn't make definite provisions that would account for all these variations.

Now, which approach would you use?

Would you use the ABA approach or would you use the approach that some of us on this committee recommend of revision, and move toward the private ownership and the private field?

MR. JOHNSON. Mr. Fulton, this, of course, is a question that we are all sweating over a good deal in NASA right now in preparing our legislative recommendations for the next session of Congress.

I would not expect Congress to repeal outright section 305, and I wouldn't think, speaking personally now, that NASA would make any such recommendation.

It seems to me that—

MR. FULTON. You, therefore, disagree with the patent section of the American Bar Association at its 1958 meeting?

MR. JOHNSON. I read that. I don't recall the detail now, but if it is true that they recommended simply an outright repeal I would disagree with that.

On the other hand, there are two ways of approaching it, and I think—

MR. FULTON. Actually, while you are on that point, while we are commenting on what they did do, they had a resolution opposing Government ownership of the patents and inventions arising from Government-financed research and development as well as repeal of the patent sections.

I must say that to you.

MR. JOHNSON. Yes.

MR. FULTON. 1958.

MR. JOHNSON. You have mentioned as a precedent the National Science Foundation provision. I would think that would be probably the minimum that the

Congress ought to do, if you were to undertake a radical treatment of section 305. Substitute something of that kind, which would express the concern of Congress in the protection of the public interest in patents in this field, but would leave to the Administrator great discretions as to how to do it, without imposing the kind of rules from which we now have to depart by means of waiver.

This is quite a different thing from section 305.

MR. MITCHELL. Would the gentleman yield?

MR. FULTON. I would like to have him continue. I am very interested in this point.

MR. JOHNSON. I say this without regard to whether the National Science Foundation has or has not carried out its legal responsibilities.

I don't have any opinion on that either because I don't know enough about their business.

In the alternative—and it is my guess, if I must do some forecasting now—this is probably the way we will present our legislative proposals.

MR. FULTON. I will be glad to hear it.

[24] MR. JOHNSON. In the alternative, we would propose a cleanup of this legislation along the lines you have mentioned this morning.

There are some things that obviously were done in haste, it seems to us, in this section and, on the basis of the past year's experience, even in line with what one might call the overriding philosophy of this section, you can make a lot of changes in it and make it more understandable and easier to administer.

Certainly I think the ultimate choice, as far as patent philosophy is concerned, is going to be one that the Congress will have to make and ought to make, I think, with this question of uniformity in mind, as well as Mr. King's ultimate question.

These two things have to be balanced, and whether you give one the greater consideration or the other I think is a very serious legislative problem.

My own personal preference would be to substitute for section 305 something very much like the general principles in the National Science Foundation Act and then hold us responsible for the way we protect the public interest.

MR. FULTON. How would that then correlate with your previous statement on the Department of Defense?

Why do you now say you would correlate this with the civilian agency, the National Science Foundation Act of 1950, when previously I thought you were going to say correlate it with the military and Department of Defense practices?

MR. JOHNSON. I am not suggesting the National Science Foundation just for the sake of making NASA uniform with a civilian agency. The National Science Foundation practice is actually the same as the Department of Defense practice at the present time. Now, that practice could be changed. If it seemed to be desirable in the public interest to change the practice under the broad terms of the National Science Foundation Act, they could do it. Under that kind of authority from Congress we could, as a matter of administrative policy, make our policies as uniform with those of the Department of Defense as we felt the situation demanded, and we could examine the results of that on the case-by-case basis to see whether the public interest was adequately protected.

In order to achieve uniform practice with the Department of Defense, you don't have to have uniformity in statutory language. The Department of Defense has no statutory language. The broad grant of authority to the Administrator to take such action as is in the public interest, which is really what the National Science Foundation Act says, could result in uniformity of practice, although not in uniformity of statute.

MR. FULTON. But you would still have that assertion of title under the section 305(d) and (e) remain subject to the Board of Review of the Patent Interferences, wouldn't you,

and you would also have the final decision on the authority of the Administrator of NASA, wouldn't you, that is, the final decision on waiver?

MR. JOHNSON. If we did the thing I was just suggesting, you would eliminate all of this portion of section 305 that relates to title.

The National Science Foundation Act has nothing about title in it, Mr. Fulton.

[25] MR. FULTON. I know, but I am still saying: Wouldn't you still retain a waiver provision of some type or a title provision and keep it under the Review Board of Patent Interferences and leave some final authority on that particular type of thing in the Administrator of NASA?

MR. JOHNSON. I don't see how they are compatible.

It seems to me what you are suggesting now is that you really retain a rule that says title will ordinarily vest in the Government with the power of waiver vested in the Administrator.

This is radically different from what the National Science Foundation Act says. The National Science Foundation Act doesn't impose a rule of title acquisition.

MR. FULTON. That is right.

MR. JOHNSON. It leaves all the discretion to the head of the agency.

MR. FULTON. So, you would then have the complete title provision cut out in the NASA Act?

MR. JOHNSON. This is what I would say my personal preference would be at the present time in view of the fact I feel very strongly about the inequity that now exists between the DOD practice and ours.

MR. FULTON. That is all.

Thank you.

I appreciate very much both of your comments, which have been excellent and very interesting.

MR. MITCHELL. What you are saying, Mr. Johnson, in substance, is that you are suggesting legislation which would give to the Administrator the right to determine the specific phraseology that would go into the contract insofar as whether the Government would retain title or not; is that it?

MR. JOHNSON. This is correct, which is the way I read the National Science Foundation Act.

MR. MITCHELL. Mr. Daddario.

MR. DADDARIO. Mr. Johnson, taking the present posture of the space program into consideration and also last year's experience, do you find any need that NASA have greater protection in inventions than the Department of Defense?

MR. JOHNSON. I don't think so.

By this, I am not meaning to say I agree entirely with the Department of Defense policy as a matter of policy either; but on this question I would say—and I might hark back to Mr. Fulton's remarks about the great interest in such things as space platforms and security interests, and so forth; naturally, all of this applies to intercontinental ballistics missiles, too—you have got the most urgently needed things with the greatest security considerations right over in the Department of Defense.

Our work by and large, is unclassified. Not all of it, but the greater portion of it is in the nonmilitary side of the program. I think I would have to say, honestly, that I cannot see any reason why there is a need for acquisition of title to inventions under our contracts if such a need does not exist under Department of Defense contracts.

MR. DADDARIO. Following that further, if such a need does not exist and, therefore, we can assume from that there is an imposition of a greater need than is necessary on these companies which might wish to enter into contracts with the Government, is this added prohibition, if we can put it that way, affecting the space movement?

[26] Are companies not contracting with you as a result?

MR. JOHNSON. I testified earlier that it is very difficult to get definite information on that.

MR. DADDARIO. What is your thought?

MR. JOHNSON. We have not encountered so far in any of our negotiations with contractors a turndown because of this.

We have encountered a lot of resistance, but they have all been negotiated successfully.

We cannot be sure, of course, that some of the things we hear about the complete unwillingness of some companies to do business with NASA may not be true.

We have had rumors and reports particularly at the subcontractor level that some companies have put out the word they don't want the business; they will not do any business that involves the vesting of title to any of their inventions in the Government and, hence, their people are not to bid on NASA contract proposals.

This kind of thing is hard to get definite information on because you just don't know about the people who don't respond to your invitations or requests for bids and proposals.

Some may be doing it because they don't want the business; they are completely booked up or they aren't interested; or they may be staying away for this reason.

You cannot be sure of this.

MR. DADDARIO. Mr. Johnson, if you have a company which is in the aeronautical field and, because of the great interest there is in space, it has a strong research and development section, couldn't you assume they would look very carefully into putting the endeavors that they have already put into this field to the use of the Government, when that whole program could then be taken by the Government and then passed off into commercial enterprises or to other countries or to other companies, and this could be research and development which they have built up to this point with their own means and without any Government assistance whatsoever?

MR. JOHNSON. I could speculate along those lines. That sounds quite reasonable and, of course, we are told by industry this is exactly their reaction to it.

MR. DADDARIO. Wouldn't you say this must be the reaction because this is traditional way which many companies, those with great tradition, have operated?

MR. JOHNSON. Yes.

MR. DADDARIO. They have looked ahead; they have research and development programs to keep themselves apace with progress?

MR. JOHNSON. That is true.

MR. DADDARIO. And it must necessarily, as a result, be something that they would look into very carefully, and if they are doing so, this need that you have tagged on here and which you, yourself, say is not necessary, is probably slowing down the whole space program because companies are staying away from it?

MR. JOHNSON. Mr. Daddario, I simply cannot say I know the program is being slowed down by this. I couldn't honestly say that.

Everything you say sounds reasonable, and we are told that there are companies that are reluctant—in fact, even unwilling—to do business, particularly with our prime contractors on the sublevel.

[27] I couldn't document it by saying I know X company or Y company or Z company has refused to do business with us or has slowed down their participation because of this.

MR. DADDARIO. Let me ask you this: Let's assume there is a situation where you have a company that does enter into a contract with NASA and, in the performance of this contract, it uses other inventions which it has produced to increase its technical superiority or potential. What would be the situation involving the utilization of these other inventions?

MR. JOHNSON. Do you want to comment on that?

MR. O'BRIEN. Yes.

I will comment on this, Mr. Daddario.

We do not, by acquiring a right to use or acquiring title to an invention made under contract with NASA, acquire also rights under patents on inventions developed independently of a Government contract. These are called background patent rights on inventions. The owner or right to practice the invention under contract, where we acquired rights, does not automatically give the Government rights under these background patents.

MR. DADDARIO. Who is to decide whether it follows within one patent or the other?

You have no way of waiving, do you, under the present provisions, these rights to inventions before a contract is signed?

So, if you sign the contract, then it is up to your Administrator to determine whether or not they are background inventions or whether or not they fall within the area under which they can then be separated from Government control?

MR. O'BRIEN. I think I misunderstood you perhaps as to what you regard as a background invention.

We regard as a background invention an invention which has been made by a contractor prior to the entering into a contract with NASA, and by "made" we mean actually reduced to practice.

As to those inventions, NASA would acquire no rights merely because an improvement on that invention was made in the pursuance of research work under a NASA contract.

MR. DADDARIO. Let me ask you this: Is there any provision at the present time under which a waiver can be granted before a contract is entered into?

MR. O'BRIEN. The law so provides.

Our regulations do not provide for granting of any waivers prior to entering into a contract.

MR. DADDARIO. Then, under the act, the situation is this: Under all circumstances, even though the Administrator would have the authority, as the chairman has pointed out previously, you would first have to give him the complete control and he would then have to decide whether or not it fell within the categories set forth?

MR. O'BRIEN. That is right, sir.

MR. JOHNSON. I think we might mention the prima facie case for waiver, though, in this connection.

MR. O'BRIEN. Yes.

MR. JOHNSON. I think this is related to the questions you asked.

MR. O'BRIEN. Yes.

[28] In this regard, we have established certain categories of invention. If an invention which is made by a contractor falls within these categories, and he can show to the Administrator or to the Inventions and Contributions Board that this is so, then the contractor has established a prima facie case for waiver of title or the waiver of the right of the United States to acquire title.

Now, these classes of inventions are, one, those inventions which a contractor may have conceived prior to entering into a contract with NASA and upon which he has filed a patent application, but which was first actually reduced to practice in the performance of the contract.

That is the first class.

MR. DADDARIO. Before you go further, because there isn't much time and there may be others who have questions, there is one thing which bothers me here and I am sure you can give me the answer.

When a waiver is granted under any circumstances, are there minimum requirements?

MR. O'BRIEN. There are.

MR. DADDARIO. Therefore, there is no such thing as a complete waiver?

No matter what the situation might be, once an invention comes under the jurisdiction of NASA, whatever waiver is granted, there are minimum requirements and, therefore, a sort of a cloud on the title of whatever the invention might be?

MR. O'BRIEN. The first class of invention which I gave you—there are very minor requirements.

MR. DADDARIO. But some?

MR. O'BRIEN. With respect to this first class of invention, the requirements would not place any cloud on title.

We have certain requirements in our waiver instrument, but as to those requirements they would not place a cloud on title.

As to other categories of invention, the requirements are provisional; that is, title is provisional, the retention of title is provisional, upon the satisfying of certain requirements, those requirements being that the invention should be developed to the point of practical application, which means that it must be developed so that it is put into the hands of the public. We believe that the granting of rights to inventions to a contractor by waiver must carry some assurance that the contractor will not shelve the patent on this invention or not let the public have the benefit of it. If this were to be permitted the waiver would not be in the public interest. For that reason, we have placed compulsory working provisions upon the grant of these waivers. So, if the invention has, in our view or in the view of the contractor, to which we agree, predominant commercial interest and only incidental interest and utility in space and aeronautics and we give him the right to acquire title in the invention and the right to acquire a patent on it, then we say, "You shall practice this invention; you shall put it into the hands of the public within a period of years or you shall make it available for license to anyone who desires to do so."

MR. DADDARIO. Does that include foreign governments and foreign countries, anyone who would do so?

MR. O'BRIEN. No; I think not.

[29] Mr. DADDARIO. You think that would be restricted to the continental limits of the United States?

MR. O'BRIEN. Yes.

MR. DADDARIO. That is all.

MR. MITCHELL. Mr. Quigley.

MR. QUIGLEY. I have no questions.

I do regret my inability to be here on time. I occupied the witness stand in another committee and on a matter which was controversial. I couldn't quit under fire. So I had to stay, and I deeply regret it, because I wanted to get here and get the benefit of this background presentation. So I will have to study the record.

MR. MITCHELL. Mr. Yeager.

MR. YEAGER. Mr. Johnson, did I understand you to say in the recommendations for legislation next year there will be some recommendations for a change in section 305?

MR. JOHNSON. No, Mr. Yeager. I didn't predict that positively—

MR. YEAGER. There might be?

MR. JOHNSON (continuing). As to what NASA's position would be, I said we are hard at work in developing this as a part of our entire legislative program, and I said that, so far as a personal prediction was concerned. I would predict that we might submit even alternative provisions as means of treating this problem.

I suppose, if we did that, we would have a clear-cut recommendation as to which one we preferred.

I certainly think it is fair to say we will have some legislative recommendation to amend section 305.

I don't see how we could help but have that. This is one of our major legal problems.

MR. MITCHELL. You are going to have to live with this law, and certainly you should give us the benefit of your experience and your recommendation.

MR. JOHNSON. Yes, sir.

MR. YEAGER. Might that include section 306, too, on the—

MR. JOHNSON. That is an entirely separate question. At the present time, I don't personally have any—

MR. YEAGER. This doesn't give you concern at the moment, then?

MR. JOHNSON. No.

MR. YEAGER. As 305 does?

MR. JOHNSON. No, this is an entirely separate question.

MR. YEAGER. I would like to develop just one brief line here.

You have interpreted in section 305(a) the phrase "any work" to exclude procurement contracts; is that correct?

MR. O'BRIEN. Yes, sir.

MR. YEAGER. And according to the memorandum, I think, of May 6, which you submitted to this committee, you indicated that you are requiring your patent clause in contracts where the work is of a technical or scientific or engineering type. Does this extend to subcontracting?

MR. O'BRIEN. Yes.

MR. YEAGER. It does?

MR. O'BRIEN. Yes.

MR. JOHNSON. The description is a little more elaborate than that.

MR. YEAGER. Yes.

[30] MR. JOHNSON. I think you are giving it sort of a shorthand characterization.

MR. YEAGER. Yes; but what I wanted to get at is not in direct reference to that provision. What I am getting at is how you arrived really at the intent of Congress on this, and again in section 305(c), where apparently you have interpreted this to mean that this section applies only in the case of work, done under a contract with NASA. You say NASA has concluded that this was not intended; this section was not intended to give the Government rights under inventions outside the contractual situation with NASA.

MR. O'BRIEN. We regard this provision of the act as a policing provision.

MR. YEAGER. How did you reach that conclusion?

MR. JOHNSON. Mr. Yeager, you have asked several questions, I am not sure just which one I am answering first.

MR. YEAGER. How did you reach the conclusion that Congress did not intend for section 305(c) to apply to situations other than those where a work contract was under NASA? That is what I was getting at.

MR. JOHNSON. Section 305(c).

MR. YEAGER. The record, as I recall the previous testimony, is pretty skimpy on this.

MR. JOHNSON. Yes.

MR. YEAGER (continuing). And I was just wondering whether you perhaps didn't have to just play it by ear.

MR. O'BRIEN. I think a resolution reading of 305(c) and a reading of 305(d) answer that the information on the material, which, under these provisions of the act, the Commissioner of Patents is required to secure from the applicant for a patent, is that

information and material which bears directly upon the circumstances surrounding the making of the invention and whether or not it was made under any contract with NASA.

So, if all of the information and material which is submitted in these statements which the Commissioner secures, bears on the question of whether or not the invention was made under any contract of NASA, what other purpose could this provision of the law have other than to make inquiry as to whether or not it was made under a contract?

Therefore, we believed this provision generally to have two purposes, the first providing a policing provision for our contracts and the second providing an opportunity to have the Administrator's determination, subject to a review by another independent agency; namely, the Board of Patent Interferences of the Patent Office or, ultimately, the Court of Customers and Patent Appeals.

We tried to derive from this subsection of the act some incidental advantage to NASA, from a technological point of view, that in bringing this information to the attention of the NASA technical staff, where the inventions are of significant utility to space and aeronautics NASA might derive some technology benefit from its disclosure.

It hasn't proven to be of much value in this respect, but—

MR. YEAGER. What I was trying to get at was: You say you believe this to have been the case, and this seemed reasonable to you. [31] But as far as the record shows, there isn't much to go on, since there were no bearings and very little debate on it in Congress, and the conference report was very meager.

MR. O'BRIEN. The conference report has—

MR. YEAGER. It says something about it, but my question is: Wouldn't you agree this is susceptible of a different interpretation?

MR. JOHNSON. Mr. Yeager, I would like to answer that.

You mentioned before, I think, three or four important interpretations we have given to section 305. In the absence of any legislative history, all of these have been rather arbitrary. I have to admit that.

This is the problem you are faced with in giving an initial interpretation to any important piece of legislation.

I don't think in any of these cases that we have done violence to the statutory language, and we have always tried, as well as we could, to discover from reading the sections as a whole what we felt the legislative intent was.

Mr. O'Brien has just explained how we think the interpretation we have given to section 305(c) does derive from a study of the section as a whole.

MR. YEAGER. Sure.

MR. JOHNSON. This is true of all the rest of it, but we would admit these are arguable propositions.

We have tried in each case also, while not doing violence to the language, to try to reach an interpretation which we thought was a most workable one and one that we could administer.

MR. YEAGER. Yes.

I wasn't suggesting there was any violence done to it. The only point I was driving at was: Unless these sections are clarified, perhaps at some point in the future a future administrative body might very well construct them differently than you have.

MR. JOHNSON. That is quite possible.

I would like to say, too, that we have tried, each step along the way, to keep the committee fully informed of the administrative interpretations we have given this act.

I think you have been constantly supplied with our regulations and contract clauses and have been informed of all our significant steps just as soon as we have taken them.

MR. YEAGER. Thank you.

That is very helpful.

MR. MITCHELL. Mr. Bass.

MR. BASS. Mr. Johnson, I just want to say I have been very much impressed with your presentation, and particularly the grasp that you and Mr. O'Brien have shown of this very complicated technical field.

Would you give us, very briefly, a biographical sketch of yourself?

It might be interesting.

MR. JOHNSON. I am a graduate of DePauw University, and University of Chicago Law School, and have a graduate degree from Harvard Law School, LL.M. I am a member of the Illinois bar, practiced law in the general counsel's office of the Chicago, Burlington, & Quincy Railroad and with the law firm of Wilson & Mellvaine in Chicago before World War II.

MR. BASS. I know the firm very well.

MR. JOHNSON. I have 3 years of active duty in the Navy.

[32] My Government service—I have been with the Department of State in the Office of United Nations Affairs and with the Department of the Air Force where I was General Counsel for the last 6 years before assuming the position of General Counsel of NASA last October.

MR. BASS. How old are you?

MR. JOHNSON. Forty-three.

MR. MITCHELL. Any further questions?

MR. DADDARIO. No further questions, Mr. Chairman.

MR. MITCHELL. Let me express appreciation on behalf of the committee for the appearance of both you, Mr. Johnson, and you, Mr. O'Brien. Certainly the information you have given us will be of help. As I stated previously, we are in no hurry on this matter and we will be looking forward to seeing you back with an official recommendation.

Thank you very much.

MR. JOHNSON. Thank you very much, Mr. Chairman.

MR. MITCHELL. The committee will be in recess until 10 in the morning.

(Whereupon, at 12:04 p.m., the meeting was recessed, to reconvene at 10 a.m., Thursday, August 20, 1959.)

[33]

Property Rights in Inventions Made Under Federal Space Research Contracts

Thursday, August 20, 1959

House of Representatives,
Subcommittee on Patents and Scientific Inventions,
Committee on Science and Astronautics,
Washington, D.C.

The subcommittee met, pursuant to adjournment, at 10:10 a.m., Hon. Erwin Mitchell (chairman of the subcommittee) presiding.

MR. MITCHELL. The subcommittee will be in order.

This morning we are privileged to have Mr. Ray M. Harris, Assistant Patent Counsel, National Aeronautics and Space Administration, who formerly was chairman of the Armed Services Procurement Regulations Committee, and procurement and patent specialist, Department of Defense.

Mr. Harris is presently with the Space Administration, as I pointed out. The purpose of his appearance today is to brief the members of the committee on patent policies followed by the Department of Defense and other Government agencies.

We are happy to have Mr. O'Brien back again this morning.

Do you have a prepared statement, Mr. Harris?

Statement of Ray M. Harris, Assistant Patent Counsel, NASA; Accompanied by Gerald D. O'Brien, Assistant General Counsel for Patent Matters, NASA

MR. HARRIS. Mr. Chairman, as announced, my subject was supposed to be the patent policy of the Department of Defense and other Government agencies, but I felt they were discussed pretty extensively yesterday and probably if the members have any more interest in those policies than was brought out yesterday, it could be handled by questions.

On the other hand, in view of some of the questions raised yesterday, I thought the members might be interested in a discussion of some of the more fundamental aspects of the patent problem and system as an aid to arriving at a determination of what the Government's patent policy should be. Mr. King particularly raised that question.

I thought if the committee would care to, I would discuss that aspect.

MR. MITCHELL. I think it would be most benefiting.

MR. HARRIS. My prepared statement here is a couple of pages of introduction. The first paragraph is what I have already said and then the second paragraph:

[34] I would like to say at the beginning that these are my personal views and have not been coordinated with my superiors, Mr. O'Brien and Mr. Johnson. I agree with Mr. Johnson, who spoke yesterday, that this problem is so complex that it is difficult to give a categorical answer.

As Mr. Johnson said, this problem has been with us for many, many years. One might be justified in arriving at different answers to the question with respect to Government employees' inventions versus Government contractors' inventions, with respect to different Government agencies, and with respect to different fields of technology.

The problem is currently being studied by the staff of the Patents, Trademarks, and Copyrights Subcommittee of the Senate Committee on the Judiciary and by an interdepartmental working group under the chairmanship of the Commissioner of Patents, Study No. 14 of the Interagency Task Force for Review of Government Procurement Policies and Procedures.

Mr. O'Brien is a member of this study group 14 and I was while I was with the Department of Defense.

The problem has been the subject of numerous studies in the past, most notable being the Attorney General's report of 1947 to which there was a sequel report of November 9, 1956. In the sequel, the Attorney General pointed out that the Department of Defense patent license policy was permitting the concentration of patents in the hands of big business.

I would like also to mention, in the interests of what has been done on this subject, that Dr. Howard L. Forman, who is a personal friend of mine, got his Ph.D. degree on the subject as a result of his investigations into what should be the patent policy of the Government with respect to its employees' inventions and has written a book on the subject: "Patent—Their Ownership and Administration by the United States Government" published by Central Book Co., Inc.

I think the above introduction indicates the extent of the problem. Nevertheless, I have a conviction that the people concerned with this problem have spent too much time attacking it from the standpoint of who should have the rights to patents as a matter of

law or equity, and not nearly enough time as to what is the purpose of ownership of a patent, and from the Government's viewpoint, what should it do with the patents it owns. If the Government doesn't have a good program of administration of its patent property, why should it be so concerned with getting title to the patents, and getting more patent property?

I might say also, Dr. Forman takes that position, that we have the cart before the horse. We have been concerned with deciding who should get the rights to the patents and we haven't decided first what we are going to do with the patents we've got.

MR. KING. As a matter of fact, what does happen to Government patents? Do they go into the public domain or are they locked up for 17 years?

MR. HARRIS. The practice largely with Government-owned patents is, in effect that they come under the public domain because the Government does not have a policy of enforcing its patents. In order for a patent to be used as the patent law intends it to be, it must be exercised—the exclusivity provided by the patent must be exercised which [35] means that you must use it for yourself or your licensees and not permit others to use it. The Government's policy is exactly the opposite. When it gets a patent, most of the Government agencies will grant a revocable, not an irrevocable, royalty-free license to anyone who asks for it. If you don't ask for it, it is all the same because they won't sue you for infringement.

Mr. O'Brien, would you like to add to that?

MR. O'BRIEN. I would only mention that one of the reasons for the Government's patent policy, as Mr. Harris has stated, is that the major executive branches of our Government have no authority to grant rights in patents which that agency of the Government may own. The Congress has never provided the executive branch of the Government with that authority except in a few instances such as the Tennessee Valley Authority and the AEC.

MR. HARRIS. And our own organization.

MR. O'BRIEN. And the NASA.

MR. MITCHELL. Mr. King, will you yield?

MR. KING. Yes, I am through, Mr. Chairman.

MR. MITCHELL. I understand you to say that in most agencies you do not have the authority to grant licenses?

MR. O'BRIEN. The authority to grant any irrevocable or exclusive license.

MR. MITCHELL. The policy has been to grant these licenses but they are revocable?

MR. O'BRIEN. That is right.

MR. BASS. Does that also mean the Government cannot collect royalties and enter into that kind of agreement?

MR. HARRIS. I think it would mean that except in the case of these agencies which have the authority such as NASA, TVA, and AEC, I believe.

MR. BASS. They have the authority?

MR. HARRIS. Yes.

MR. BASS. Do they exercise it?

MR. HARRIS. No, sir.

We haven't developed our policy on the subject. We are in the process of trying to formulate a policy but one of the difficulties that one is going to have in trying to grant royalty-bearing licenses is that it is obligatory on the licensor in such cases to defend that patent against infringers because it is unfair to the person who takes a license and agrees to pay royalties if somebody else would start to manufacture the thing and not pay royalties and have it royalty-free.

So, therefore, in private practice, it is incumbent upon the patent owner who grants a license to undertake to sue infringers. In the Government's case, if it were to adopt a policy of granting royalty-bearing licenses it would mean the Department of Justice would have to sue infringers of patents.

MR. KING. May we pursue this, Mr. Chairman.

MR. MITCHELL. Yes.

MR. QUIGLEY. May I ask a question here just for clarification?

Do I gather, sir, that the Tennessee Valley Authority and the AEC, those two, have in the past granted exclusive licenses, not with the royalties attached?

MR. HARRIS. The Tennessee Valley Authority has granted at least one royalty-bearing license.

[36] MR. QUIGLEY. At least one royalty-bearing?

MR. HARRIS. Yes. The AEC has never granted more than a revocable license, which the Department of Defense also grants. They have never exercised the authority of their act.

MR. QUIGLEY. In other words, while the AEC has the authority to grant exclusive irrevocable licenses, they have not in fact exercised it?

MR. HARRIS. That is right.

MR. QUIGLEY. What you are saying in effect, then, is that the only Government agency that has done that would be the TVA?

MR. HARRIS. That is right, and also that license was to a British concern and it may be that they didn't know the situation over here, as well as ourselves, because had I been representing an American client or them, I would have advised then not to enter into a royalty-bearing license.

MR. QUIGLEY. Even though this authority has existed on the books for a number of years, in fact it has not been exercised?

MR. HARRIS. That is right.

MR. QUIGLEY. With this one exception?

MR. HARRIS. That is right, sir.

MR. O'BRIEN. I would like to add one comment.

The Tennessee Valley Authority does grant licenses which are irrevocable, but not royalty-bearing. It has granted exclusive licenses.

MR. QUIGLEY. That would be the only agency of the Federal Government that has done that. AEC has the authority to, but hasn't.

MR. O'BRIEN. Yes, sir, except for a few instances of vested property of the Alien Property Custodian where licenses have been granted under those vested patents.

MR. MITCHELL. Mr. Harris, this example you gave of the British concern obtaining a license was later canceled. . . .

Document III-4

Document title: T. Keith Glennan, Administrator, Memorandum for Distribution, "Appraisal of NASA's Contracting Policy and Industrial Relations," February 29, 1960, with attached: "Preliminary Outline of Plan for Appraising NASA's Contracting Policies and Industry Relationships," February 26, 1960.

Source: NASA Historical Reference Collection, NASA History Office, NASA Headquarters, Washington, D.C.