

WSED (IDA) was physically located outside of the Pentagon (68).

IDA's mandate soon expanded. In 1958, at the request of the Secretary of Defense, IDA established an Advanced Research Projects Division to support the newly created Advanced Research Projects Agency (ARPA, later Defense Advanced Research Projects Agency, now again simply ARPA) in DoD. In 1960, the Division was reconstituted as the Research and Engineering Support Division to undertake technical studies for all the offices of the Director of Defense Research and Engineering, including ARPA. At about the same time, IDA founded its Princeton-based Communications Research Division, whose mission was to carry out a long-range program of studies in communications, particularly research in mathematics, to support the work of the National Security Agency.

In 1961, the Logistics Management Institute (LMI) was created to serve as a research aid to the Assistant Secretary of Defense for Installations and Logistics (68). It was listed by the National Science Foundation that year as an FCRC and then disappeared from the listings until 1984, when it officially resurfaced as an FFRDC (52).

■ Conclusion

Twenty-three federal research centers existed in 1950, three of them study and analysis centers. The number of centers grew, especially in DoD. In 1962, when the name "FCRC" was established, there were 66 of these centers, with an all-time record 43 DoD centers. The research centers had differentiated into three basic types: 1) laboratories, 2) study and analysis centers, and 3) engineering and technical direction centers. Only six of the 43

DoD FCRCs have survived as FFRDCs until the present day (along with LMI, which became an FFRDC in 1984). The study and analysis centers went beyond operations research into a wide range of areas and began to take on non-DoD work. They had a clear impact on what was being discussed and how it was discussed within DoD.

Much of this growth was a response to the pressures of the Cold War environment. In some cases (e.g., that of Aerospace), expediency in establishing a functional operation outweighed other considerations. Also, the Soviet launch of the first satellite, Sputnik, in 1957 propelled the United States to commit considerable additional effort to R&D, from which the centers directly benefited.

CONFLICT AND TRANSITION FOR THE RESEARCH CENTERS IN THE 1960S TO MID-1970s

■ Social Changes

Many societal forces, including changes in society's faith in the power of science and attitude toward the military, affected the federal research centers in the 1960s. During World War II and the conflict in Korea, these factors generally favored the mission of the think tanks. In the 1960s, however, they changed.

This shift can be seen in the media of the 1960s. In the early 1950s, RAND had established an office of communications and public relations and had even gone as far as to buy general corporate advertising in 1957 through 1961 in various scientific and trade journals (61,68).⁵ In the minds of many, "RAND" had become synonymous with "think tanks," even though there were a number of these in existence in the 1960s (61).⁶ RAND was

⁵ The purpose of this advertisement campaign was to increase the visibility of RAND. It originated in concern that RAND was losing out to private industry when recruiting new staff. Instead of providing recruiting ads that directly competed with commercial company's recruitment efforts (and could have raised complaints), the RAND ad campaign provided statements from RAND's division chiefs that illuminated the work and philosophies of RAND personnel.

⁶ Providing some indication of the changes in the visibility of RAND over time, there is a "selected bibliography" of articles written on RAND in the back (pp. 104-106) of *The RAND Corporation, 40th Year*. It records eight articles written on the corporation in the 1950s. It records 71 articles written from 1960 through 1970, and only 14 since 1970. While this is certainly not a definitive list, research indicates a considerable expansion in the awareness and interest in think tanks during the 60s and early 70s, and then less of an interest as they become passé.

the object of a protest-style folk song by song writer Malvina Reynolds in 1961 (68). The stereotype of a strategic advisor for nuclear strategy was caricatured by Stanley Kubrick's Dr. Strangelove from the movie of the same name. He was supposedly a strategist from the "Bland Corporation" (27).

In the late 1950s and early 1960s, the Department of Defense began to refocus on conventional warfare. As the budget began to expand in the 1960s, there came an emphasis on making the equipment more cost effective. This position was clearly stated by Secretary of Defense McNamara at his swearing in on January 21, 1961 and led to cost analysis of systems becoming part of the work of all the think tanks. The Operations Evaluation Group (OEG) had already added economists to its staff in the 1950s (68). ORO began its cost-analysis efforts in the late 1950s (77). RAND played a role, with a whole department dedicated to developing a new budgeting system for the Department of Defense. All the services began using the RAND-developed Program Planning and Budgeting System (PPBS) (68), which was extended to all of the federal government by directive from President Lyndon B. Johnson in August 1965 (18, p. 64).

The conflict in Vietnam and the opposition thereto had a profound impact on the thinking of military people, politicians, and the populace in general that influences policy and decisions yet today. Opposition to U.S. involvement in Vietnam led to a critical and often hostile view of the military by many civilians and redefined the relationship between the military and the civilian worlds.

As opposition to U.S. involvement in Vietnam and anything military heightened on college campuses throughout the United States, many FFRDCs found their connections to an educational institution a liability (and vice versa). There were even concerns about being able to protect the research on campus.⁷ The relationship with

SORO, and its successor CRESS, at the American University declined in the late 1960s, with animosity coming from the school's professors and protests by the students (25). In the fall of 1967, the Students for a Democratic Society (SDS) organized protests to sever Princeton's ties with IDA. Similar protests were conducted by students at the University of Michigan and were an issue during the 8-day student revolt at Columbia University (18, pp. 146,147). On August 24, 1970, the Army Mathematics Center at the University of Wisconsin was bombed with 1,700 lb of nitrogen fertilizer soaked in fuel oil. The blast killed one researcher, injured three others, and destroyed a building wing, seriously disrupting the center's research program. The letter to the media by the bombers accused the center of being "a vital cog in the machinery of U.S. imperialism." The Army Mathematics Center was probably one of the least important DoD centers. It primarily conducted basic mathematics research, stimulated scientific contacts between military mathematicians and their civilian counterparts, and provided a training service in applied mathematics. After the bombing it was removed from the list of FFRDCs but continued to operate with support from the Army (18, p. 151). There were a number of demonstrations against CNA at the University of Rochester campus (13, p. 20), a factor in the migration away from University administration. As of June 1968, 10 of 16 DoD FFRDCs were administered by universities (52, p. 97). As of FY 1995, only 2 out of 10 DoD FFRDCs are administered by universities, both laboratories (53).

■ Criticisms of Federal Research Centers

Criticism of federal research centers also came from private industry, which objected to competing with organizations funded and established by their own federal government. The *Congressional Record* of June 2, 1960 on "Competitive Private

⁷ One independent government research consultant studying causes of political violence had his graduate student assistants help him make copies of all the files from the study, which were being stored in the library at San Diego University, for fear of violence to that building. Interview with Professor Ivo Feierhabend, San Diego University, March 1983.

Enterprises in Space,” for example, provided criticism of federal research centers as nationalized industry competing directly with private enterprise on a subsidized, nontax basis. It is not entirely possible to refute this criticism. Federal research centers were clearly established for the purpose of doing research and analysis for the federal government in an environment where there was a stable research facility, no market pressure, no conflict-of-interest questions, and the capability to produce the kind of the independent analysis unlikely to come from either a federal government agency or a for-profit private company.

Having a research and advisory center as part of a manufacturer and commercial competitor for hardware had led to conflict-of-interest problems, causing RAND to separate from Douglas, Aerospace to be created to replace TRW, and also providing the impetus behind the creation of ANSER Inc. independent from Melpar. In the early 1960s, IDA also opened itself up for this type of criticism when it had employees “on loan” from industry working on its staff (68).

There is also criticism, not well documented, that many federal research centers are simply not fully productive and are not always cost effective. The organizations themselves, on the other hand, are required to document their accomplishments, which include cost saving and improvements in effectiveness. In addition, the federal government regularly evaluates and documents the effectiveness and cost management of the centers. The fees that these organizations receive have come under attack at various times as being inconsistent with a not-for-profit organization, despite explicit provision for such fees in the Defense Acquisition Regulations (16). Some of the federal research centers charged the federal government fees, above and beyond the cost of doing the work contracted, to provide capital funds for the organization and funds for other activities.

Congressional Criticism

By the early 1960s, Congress was clearly wary of, if not actually opposed to, federal government support of not-for-profit corporations. A paper prepared in 1958 for a subcommittee of the U.S. House of Representatives Committee on Government Operations suggested that the issuance of contracts for research needed to be examined. It stated, “While the evidence is not entirely clear, it does seem to be true that contracting methods and specifications appropriate to the administration of traditional functions of the federal government have been carried over by brute force and sheer awkwardness into the area of scientific research contracting, in which they protect adequately the interests neither of the federal government nor the contractor.” (9, p. 81).

A federal government committee appointed by President John F. Kennedy in 1961, under the Director of the Bureau of the Budget, David Bell, examined the usefulness of contracting for work, reviewed the contracting procedures, and sought to determine what limitations within the federal government result in the use of contractors. The committee looked into aspects of federal government contracting for scientific evaluations and advice, research engineering services, and technical and administrative management services. The committee’s report (often referred to as “The Bell Report”) was made public on April 30, 1962 and was the first comprehensive consideration of the issues related to contracting for services and expertise. Only in passing did it specifically address federal research centers (9,68).⁸

One of the primary recommendations of the report was that the federal government needed to raise federal salaries to be able to “obtain and hold first-class scientists, engineers, and administrators” (9). No recommendations were made related to any specific federal research center or to re-

⁸ The director of the Bureau of the Budget, and the leader of the effort was David E. Bell, so this report is usually called the Bell Report, even though those words appear nowhere on the report.

search centers in general. Concerning the issue of compensation, the report stated: “We have carefully considered the question whether standards should be applied to salaries and related benefits paid by research and development contractors doing work for the federal government. We believe it is desirable to do so in those cases in which the system of letting contracts does not result in cost control through competition.”

The Bell Report acknowledged the criticism that the new not-for-profit contractors doing systems engineering and technical direction work were intruding in areas traditionally done by private business. (The American Federation of Government Employees had submitted a statement in August 1961 to the 87th Congress, House Committee on Armed Services, expressing concern over the adverse effects of contracting federal government work to private business (9, p. 78).) The report concluded that, “The present intermingling of the public and private sectors is in the national interest because it affords the largest opportunity for initiative and the competition of ideas from all elements of the technical community. Consequently, it is our judgment that the present complex partnership between Government and private institutions should continue.”

The report validated the original rationale for creating federal research centers as independent sources of analysis with the caveat of strong leadership. It noted that:

Not-for-profit organizations (other than universities and contractor-operated Government facilities), if strongly led, can provide a degree of independence, both from Government and from the commercial market, which may make them particularly useful as a source of objective analytical advice and technical services....Contractor-operated Government facilities appear to be effective, in some instances, in securing competent scientific and technical personnel to perform research and development work where very complex and costly facilities are required and the Government desires to maintain control of these facilities (9).

The high salaries of employees of federal research centers have come under congressional

scrutiny more than once. IDA and RAND, in particular, had a reputation for paying the highest salaries of the think tanks and contrasted sharply with their civil service counterparts. For example, in 1957 and 1958, IDA provided a major share of ARPA’s initial working staff, for ARPA at that time had only a skeleton civil service staff. Thus IDA personnel and ARPA personnel were working at identical jobs with IDA personnel getting paid more (68). Aerospace and MITRE, using engineering and technical personnel with a high commercial marketability, were paying higher salaries than the think tanks (68, pp. 287,288).

Criticism of federal research centers in Congress in the late 1950s was primarily focused on problems related to one program or one corporation. A general analysis of the use of federal research centers does not appear to have been conducted prior to the Bell Report.

One corporation singled out was The Aerospace Corporation, established to help integrate the Air Force’s Ballistic Missile and Space Program in the late 1950s, the most expensive defense program undertaken up to that time. For this and other reasons, it was the one federal research center that came under repeated congressional scrutiny in the late 1950s and early 1960s. The issue of salaries raised in the U.S. House of Representatives in the early 1960s was almost entirely focused on Aerospace Corporation.

In May 1961, the House Committee on Government Operations held a hearing on the formation of The Aerospace Corporation. This hearing addressed such items as salary scales, conflicts of interest, facilities, fees, and patent rights. It also discussed the concerns of private industry over systems engineering agents as “meddlers in the weapon-building process and as piratic employers of scarce or highly prized scientific personnel” and the concerns of federal government critics who thought these agencies were taking on tasks that should be performed by the federal government (9, p. 80).

The House Committee on Appropriations held hearings on Department of Defense Appropriations for 1962. On the establishment of Aero-

space Corporation, one witness stated, “My comment is, with the present rules and regulations, you could not set up an organization like the Aerospace Corp. within the Government in the time available to set it up. We needed it right away. It would be infeasible to have done it within the Government.” (9, p. 77)

The House Committee on Appropriations in June 23, 1961 reported that:

....to a considerable extent the use of contracts with not-for-profit organizations is merely a subterfuge to avoid the restrictions of civil service salary scales.

It is noted that the buildup of these organizations has not been accompanied by corresponding reductions in the number of military and civilian personnel on the Government rolls... Military and civilian personnel on the payroll should be competent to do the jobs assigned to them or they should be removed from the payroll. (9, p. 78).

The committee found Aerospace’s salaries excessive, its overhead too high, and its planned staff too large (9, p. 78). Aerospace salaries also came up at a House of Representatives’ Committee on Post Office and Civil Service Manpower Utilization in the Federal Government in 1961 (9, p. 82). The Defense Appropriations Subcommittee of the House Appropriations Committee stated, “The Committee feels that the salaries paid by the Aerospace Corporation are excessive, that its overhead costs are too high, and that it plans to employ too large a staff.” The Committee reduced the funding for Aerospace, and placed a ceiling on the Aerospace program element that could only be raised with the consent of the Committee (1, p. 198).

Whether or not this is a valid basis for criticism, the federal research centers *were* designed to attract the best and the brightest people available using salary above the wage scale the federal government offers as an incentive. Furthermore, the space program was expanding rapidly and reduction in personnel could not be expected.

On the other hand, the House of Representatives Committee on Science and Astronautics

commissioned a staff study on Aerospace and related organizations in 1963 to review whether or not they merited their special relationship with industry and the federal government. The study found that Aerospace provided the following functions:

- technical direction and management of engineering systems (especially missile and space systems),
- technical troubleshooting,
- judgment of technical aspects of industrial proposals,
- origination and development of scientific and technical ideas and plans,
- laboratory research, and
- confidential technical advice (2, p. 2).

In 1964 Congress, concerned about the growth of the research centers, placed a ceiling on the total funds for FCRCs. This ceiling was enforced starting in 1967 (85, p. 313,314), though Aerospace had had a ceiling since 1961, as described above.

An intense examination of Aerospace was conducted in 1964 and 1965 by the Special Investigations Subcommittee of the House Armed Services Committee, chaired by Congressman Porter Hardy (D-VA). The Committee reviewed cost items, acquisition of property, construction of buildings, the fee, the cost of moves, salaries, compensation, sick leave policy, and other matters. No evaluation of the technical performance of Aerospace was attempted. The Air Force strongly supported Aerospace during this investigation. Hearings resulted in a law requiring congressional authorization before Aerospace could purchase buildings or real estate, regardless of which Aerospace funds were used (85, p. 198). Because Aerospace already had built a number of facilities, the need for more did not arise until the 1970s, when approval of a new building took two years to obtain (85, pp. 203,204).

A ceiling placed on MITRE in 1964 applied only to Air Force work. Another ceiling, placed in 1968, applied to all DoD work. In that year MITRE’s board of directors amended its certificate of incorporation to allow MITRE to do work

outside the federal government. DoD policy encouraged diversification outside DoD (43, pp. 126,252).

The Military Services

During the late 1960s and early 1970s the Army and Air Force both became increasingly dissatisfied with their FFRDCs. The Army decreased its support to SORO (renamed the Center for Research in Social Systems (CRESS)), HumRRO, and RAC. Further budget cuts resulted in CRESS seriously decreasing its staff. HumRRO became a private company. RAC was sold to General Research Corporation, a private company, after the Army informed RAC that it would no longer be supported as an FFRDC. The Army formed the U.S. Army Concepts Analysis Agency (CAA) (77,86,32)⁹ in the early 1970s to replace RAC with its own in-house research organization (77), implying that the independence of the advisory organization was no longer an issue. The Army offered to bring part of the RAC staff in-house, but RAC decided to pursue selling itself to an outside company (20, p. 11). By September 1972, the Army sponsored no FFRDCs (52) but did continue to contract with some Air Force-sponsored FFRDCs.

The Air Force, for its part, decided that RAND was not responsive to its needs. (OTA notes that this complaint is stated openly in the RAND official 25-year history.) (68,59,60) As early as 1952, an Air Force study voiced complaints about RAND isolating itself from real weapons development by avoiding involvement in evaluations and by its refusal to participate in analysis that could lead to the granting of a contract to an industrial firm. Doing so would have directly involved RAND in evaluating other firms weapon system's proposal and compromised its independent "unbiased" position that was its reason for separating

from Douglas Aircraft four years earlier (68). However, this role is regularly filled by Aerospace and MITRE.

RAND's failure to support the Air Force's position on the B-70 bomber was particularly annoying to some members of the Air Force. The effect was that RAND's budget in 1961 was initially cut in half, to \$7 million. While this money was restored in the DoD budget before it went to Congress, the cut heralded a long, difficult period for the company's relationship with the Air Force. RAND's relationship with the Strategic Air Command, in particular, was troubled during the late 1950s and early 1960s (68).

Also, the Air Force felt that its unique lawyer-client relationship with RAND had been compromised by the extensive work RAND was doing for the OSD and other organizations. RAND shrank from a peak of 1,100 employees in 1963, with perhaps 900 involved in Air Force work (59), to approximately 1,000 employed, but only approximately 400 involved in Air Force projects in 1973 (60).

In the end, the Army shut down CRESS, RAC, and HumRRO, and the Air Force's participation in RAND was cut in half by the early 1970s. This entire shift in relationship with the Army and the Air Force occurred over seven years (roughly 1965 to 1972).

Though the Navy did not have such dramatic shifts in relationships with its research centers, there were, nonetheless, changes. With the increased U.S. involvement in Vietnam, in 1964 CNA's OEG resumed its interdiction studies. As the U.S. Navy's largest combat role in the Vietnam war was interdiction and air strikes, the operational analysis focused on these efforts as well as on the Navy's "brown water" riverine force interdicting supplies in the Mekong Delta. A separate division was established for Southeast Asia studies,

⁹Charles A. H. Thomson, in his 1975 history of RAC, mentions that the U.S. Army was setting up an organization that would take over some of the functions of RAC. That this organization was the U.S. Army Concepts Analysis Agency was confirmed in interviews in February 1994 with Howard Whitley, the Special Assistant for Model Validation at CAA and with Colonel William A. Lawrence (ret.), who was assigned to CAA when it was established in January 1973.