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The Project RAND (later Project AIR FORCE) Manpower, Personnel, and Training Program is designed to provide the Air Force with a unique research capability at a time when people and people-related services claim an increasing share of the defense budget. Working closely with the Air Staff, we are concerned with both long-term solutions to fundamental problems and short-term actions to improve the operational effectiveness and the cost-effectiveness of the Air Force.

During the past several years, the program has expanded in scope. The research had originally centered on problems caused by conversion to the all-volunteer force. Today, the program also emphasizes the development of new planning methodologies, the analysis of policy alternatives to improve personnel management and cost-effectiveness, basic research to seek improvements in the dynamic interaction among the manpower, personnel, and training systems. In short, the program's research agenda is designed to be relevant and responsive to the wide range of Air Force organizations.

THE ALL-VOLUNTEER FORCE

The advent of the AVF was a major and fundamental change that affected all aspects of the way the Air Force procures, trains, and utilizes personnel. Although the transition from the draft-oriented procurement system has generally gone well, problems persist in several areas.

Reserve Personnel Analyses. A major problem, pointed up in earlier Rand research, is the inability of the Air National Guard and the Air Force Reserve to attract enough non-prior-service personnel to maintain traditional quality standards and personnel structures. At the request of the Office of the DCS/Personnel, Hq USAF, we sought solutions to this problem by way of three studies:

First, we designed and analyzed a controlled experiment in which a small number of selected reserve units were allowed to offer shorter terms of enlistment. We proved that adoption of such a policy would

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be counterproductive. Implementing shorter terms of enlistment would have little effect on recruiting in the short term and would lead to aggregate man-year losses and more serious manning problems in the future. As a result of our work, the Air Force rejected shorter terms of enlistment as a viable recruiting option.

Second, we carried out a detailed statistical analysis of the effects of the new Air National Guard recruiter program. We found the program to be highly cost-effective, especially when compared with the likely cost and effectiveness of a bonus program. We estimated that a bonus program equal in cost to the recruiter program would attract some 1700 fewer airmen; i.e., the bonus would be only 11 percent as effective as an equal-cost recruiter program.

And third, in anticipation of future shortages of non-prior-service personnel, we analyzed the effects of such shortages on the combat capability of the Air Reserve Forces. Our research indicates that restructuring reserve units and increasing the use of airmen who had previously served on active duty would provide a more cost-effective posture in the reserve. We found that at a constant force strength a substantial shift from non-prior-service to prior-service airmen could be accomplished at no additional cost. If end strengths were reduced consistent with the increased productivity of a more senior (prior-service) force, substantial cost savings are likely.

Recently the Air Force Reserve altered its objective force structure to reflect a 68% prior service/32% non-prior-service mix. They explicitly noted that this new mix was preferable because of "training cost, retirement costs, pay and allowances, and productivity" measures as developed by the Rand study.

Health Delivery System. The AVF continues to cause problems for the Air Force's health delivery system. After World War II, the draft and related programs ensured an adequate supply of physicians, enabling the Air Force to offer a wide range of services to active-duty personnel and retirees, and their dependents. The ending of the draft raised fundamental questions about the future course and structure of the Air Force medical service. In response to a request from the Air Force Surgeon General, we are investigating three basic questions:

- o What will be the future supply of physicians to the Air Force and how can the supply be affected by various policy options?
- o What is the demand for health care and how can policy controls affect the demand?
- o What alternative health delivery technologies are available to meet this demand?

Our research to date indicates that, even with the physician bonus and scholarship program, the Air Force will remain below the level of physician manning considered necessary to fully staff all medical facilities. This points up the importance of alternative delivery techniques and ways to conserve the scarce physician resource. To examine this issue, we collected data on out-patient clinics at nine Air Force hospitals. Our analysis suggests that alternative clinic organizations that stress the use of physician "extenders" might be cost-effective, with a potential savings of about \$15 million per year in direct salary costs, without compromising the high quality of care at Air Force facilities. With the approval of the Surgeon General, we have designed and are helping to implement a test of this concept at four Air Force bases.

The work we are doing on these relatively long-term problems also provides the base for answering pressing, shorter-term questions. For example, in 1974 we completed research on the effects of physician bonus pay and the medical scholarship program and reported it to the Surgeon General. During this last period, we were able to respond to an urgent request from the Surgeon General to update our analysis. We did so, and at the Surgeon General's request briefed the results to the DCS/Personnel, the Surgeons General of the Army and Navy, and the Assistant Secretary of Defense (Health Affairs). Similarly, basic survey research done at Rand between 1973 and 1975 allowed us to respond recently to a request for analysis of current proposals to change regulations governing certificates of non-availability.

SYSTEMS FOR PLANNING

Improved planning promises large payoffs in the efficient and cost-effective use of personnel, and we continue to develop methodologies that are used by the manpower, personnel, and training communities. For example, we developed for the Air Force Management Engineering Agency a method for "quick response" estimation of manpower requirements. The new method, which uses principles of queueing theory, yields estimates that are consistent with both real-world experience and the requirements generated by more cumbersome methods now in use.

For general personnel planning, we are developing a system of models that provides a unique capability to examine both long- and short-term effects of alternative personnel policies. The system, consisting of several force-simulation, cost, and behavioral models, is designed to supplement the present limited capability of the TOPLINE/DOPMS family of planning tools. Current work is emphasizing the development of an integrated junior officer retention/planning model, a functional area model, and basic research leading to a behavioral retirement model. The DCS/Personnel also requested that we use the Rand-developed models to investigate a wide range of policy options.

Accordingly, we examined alternatives to the current "up-or-out" personnel system. We found that in general their proposals would increase, rather than decrease, the cost of Air Force officers. Our work on the up-or-out and tenure systems, together with the development of a dynamic retirement simulation model, indicates that fundamental change should be accomplished by changing the retirement system.

We are also looking into strategies for better management of the ROTC program. Currently, because of reduced requirements for officers, many ROTC institutions are graduating too few officers to justify the cost of the program. Recommendations from our work, presented to the Director of Personnel Programs, the Commandant of ROTC, and the Commander of the Air University, point to alternative ROTC structures and selected use of the ROTC scholarship as a means of acquiring the needed number of new officers and reducing program cost, while maintaining a relatively large number of ROTC detachments.

In the area of training, the Air Force recently finished a field test of our MODIA (Method of Developing Instructional Alternatives) planning system. The MODIA system introduces a simulation capability into the Air Force's Instructional Systems Development (ISD) process and provides a means for the training planner to evaluate the resource impact of a large number of alternative designs. The system addresses directly the problem of effective allocation of training resources. The Air Force's test of MODIA showed that the system is relevant to some 80 percent of the ISD systems design work. The Air Force evaluators concluded that "MODIA stimulates more thorough and innovative approaches to course design and thus makes possible the creation of more cost-effective courses." The test did point out, however, that before MODIA can provide its full potential, the Air Training Command must develop new policies to incorporate "MODIA planning" into ISD and school procedures. ATC has authorized a Phase II evaluation of MODIA to test new concepts for "MODIA Planning."

OPERATIONAL IMPACT

Several studies in this program are directly concerned with improving the cost-effectiveness of operational Air Force units. At the request of the Director of Manpower and Organizations, Hq USAF, we examined the possibility of combining a number of maintenance specialties and shops to reduce the number of people required to support tactical aircraft operations. We were able to identify several areas of poor personnel utilization through overspecialization, where broader responsibilities could result in significant savings. We estimate that in F-4E wings the combination of 21 maintenance shops into 10 would reduce manpower requirements by 17 percent.

In another study, the Tactical Air Command asked us to help find ways to reduce the high cost of supporting the Mark II avionics package on the F-111D. TAC cited problems in the hardware/software area, and also expressed concern about personnel and training. While our Logistics Program investigated the hardware/software problems, discussed earlier, the Manpower, Personnel, and Training Program evaluated the job of maintaining avionics equipment on the flight line,

and analyzed the existing training program. We found that the training program was not tuned to the job. Training was largely representative, career-oriented, and theoretical. It did not stress hands-on application of practical skills used by the majority of first-term technicians-- this notwithstanding the fact that about 85 percent of those trained in the specialty would not enter the career force. In briefings to the Commander, Air Training Command, and the Vice Commander, Tactical Air Command, we recommended, and suggested the elements of, a more relevant first-term, job-oriented, practical course of instruction. The results were also briefed to the Air Staff, including the AFAG. Subsequently, we were asked by the Office of the DCS/Personnel to participate in a Chief of Staff study to examine ways to reduce the cost of training, and by the Commander of the Air Training Command to participate in the "Hasty Grad" study of ways to improve the relevance of technical training.