major societal problems is not applied research."

McElroy pointed out that 40 percent of RANN funds were going into "fundamental work," and said that "the whole RANN program is only 13 percent of the total NSF budget, far less than the National Academy of Engineering recommended."

The program, since fairly early in its evolution, has been split into four main elements whose divisional names fairly accurately suggest their objectives. These are Advanced Technology Applications (ATA), Environmental Systems and Resources, Social Systems and Human Resources, and Exploratory Research and Problem Assessment.

Particularly at the start, RANN had influential critics, including some on the National Science Board (NSB), NSF's governing body, which is made up largely of well-known nongovernment scientists. Philip Handler, president of the National Academy of Sciences, was known to be skeptical about RANN and its rapid growth. As one of his colleagues on the board put it, "Phil hopes it will go away."

Another member said that "some members were against [RANN] in principle. Some felt it was growing too fast. And some were concerned with NSF's image." He said he now perceives a change in the board toward "a more positive view" of the program, because the quality of the program is going up.

NSB chairman, H. E. Carter, coordinator of interdisciplinary programs at the University of Arizona, sees RANN in the context of rapid, larger changes in American science. It is clear, says Carter, that "the sweep of events in the last few years has demanded from universities a new kind of activity." RANN is designed, he said, "to furnish a basis for multidisciplinary and interdisciplinary action to deal with problems involving systems, large organizations. If you consider the problems of the university, NSF has a lot in common with them.

"Universities have essentially provided a base for the individual scientist; there has been little management from the top down. That style of management is not adequate for developing effective interdisciplinary teaching, research, and public service activities. Neither is the department alone an adequate base for these activities.

"The same thing is true in the foundation. NSF responded to individual proposals. Basic research grew and also education." Some NSF programs were problem-focused, says Carter, such as administration of observatories by NSF. But these facilities were really managed by university consortiums, he says. "The foundation built its staff and organization to fit the pattern, and its major role is still the support of individual research activity," says Carter. But now the choice is "either to stagnate" or move in the direction of research that contributes more directly to the solution of rational problems. "And the same is true of the university."

In broader perspective, Carter observes that "The World War II to 1970 period produced a generation with unparalleled competence in basic research" and that we now appear to be moving into an era in which that competence will be put to more direct use.

Carter describes himself as "enthusiastic about RANN, but desperately aware of its problems." One of the obvious problems was to find the management for projects that yield practical payoffs. Grafting on this kind of management expertise was sure to create organizational and personality difficulties at NSF.

Critics have complained that NSF, in managing applied research, relied too heavily on NASA methods and NASA people, and they make at least a prima facie case for this view. At the top of NSF, engineering and systems management experience are now more heavily represented than they were in the past. Raymond Bisplinghoff, NSF's deputy director since October 1970, ran advanced research and technology operations at NASA during the Apollo buildup and came to NSF from his post as dean of the school of engineering at M.I.T. NSF's new director, H. Guyford Stever, who was president of Carnegie-Mellon University, earned his Ph.D. in physics but made his career principally in aeronautics research and administration at M.I.T.

The head of the RANN program,

Briefing

Magruder Moves On

At the end of last week, William M. Magruder, the President's special consultant charged with assembling a technology opportunities program since last September, was denying that he would soon become a technological superchief in the Nixon Administration.

Magruder in an interview said he has completed the study of technology opportunities and has moved on to another assignment, a study of United States export posture. He said he is also winding up some aspects of the technology study. Magruder claims that his study led to $700 million obligations for fiscal 1973 in a spectrum of fields, but this amount is well below the billions originally rumored. The technology proposals are expected to be the subject of a presidential message now scheduled to be delivered after Nixon returns from China, Magruder said.

Magruder said that the original deadline given him was 30 January. He says he completed the assignment early, on 10 January. On 26 January, a party was given, in celebration of the conclusion of this phase of the project for Magruder and the staff who had worked with him.

Magruder's remarks last week served to dampen the speculation, which arose when he was appointed last fall, that when the study phase was complete the former Administration SST chief would go on to assume even broader responsibilities for technology policy. At present, however, he plans to remain as special consultant and do whatever chores are assigned him, principally to participate in the exports study. The individual technology projects will be carried out by various agencies, not by a single office.

At the party on 26 January, Magruder was given a toy red plastic airplane with a revolving propeller powered by a tiny battery. The toy pilot was made to look like the flying "red baron." Magruder's colleagues in the White House, the Office of Science and Technology, and the Office of Management and Budget had signed the trophy, and someone had painted one-half of the red baron's helmet black, with the letters "SST" on it. The other half of the helmet was painted white, and had the initials "TOP" for Technology Opportunities Program, on it.—D.S.