

string the institute director in his dealings with his own staff and with LDC representatives with whom the institute might be involved in projects.

Some of those who have been engaged in planning for the institute are candid in saying that strong cases can be made on both sides of the governance question. They also concede that the draft provisions on governance which originally went to the Hill were regrettably bland. They note that these provisions were strengthened in several important respects during the House Foreign Affairs Committee's consideration of the legislation. For example, the council was given an executive committee which will meet more frequently than the parent body. The terms on which the institute director will consult the council on programs and policy were made very specific. And the council was charged with making a detailed annual report which will become part of the institute's report to Congress. The committee report reinforces the council's hand by writing into the legislative history of the bill the House's specific intent that "the Council be a strong and informed body that will play an ac-

tive role in the affairs of the Institute."

The planners argue that the institute, under the Administration design, would have a desirable balance of autonomy and capacity to coordinate. Perhaps more important than the governance issue, they say, is the matter of assuring that ISTC is protected from the perils of "lateral clearance"—that is the approval of programs by other agencies—and also shielded from transfers of unsuitable programs and personnel. And inevitably there is the matter of money. ISTC is assigned \$25 million in budgeted funds, but this is to come from the total aid budget and will require economies elsewhere. The funds are not being provided separately as originally intended by the Administration.

The strengthening changes in the ISTC governance portions of the House bill were welcomed by Congressman Brown who spoke generally in favor of the ISTC on the floor. Senator Stevenson says he will continue to work for a more independent governing body in the Senate. The Council on Science and Technology for Development still appears unsatisfied with the modified governance provi-

sions. The council will hold its annual meeting in Washington on 23 April and will discuss a recently completed assessment of ISTC's progress. That assessment will be available to the Senate when it takes up the foreign aid bill.

The general prospects of the institute appear promising unless unforeseen disaster overtakes foreign aid legislation. ISTC governance remains a possible point of conflict. But Congress is likely to focus on sections of the legislation involving much grander sums of money and far more controversial issues. And there is a tendency for legislators at this stage of the session to begin to lose patience with administrative niceties.

The debate over governance, however, has already had the effect of pushing the institute in the direction of greater autonomy, which most observers feel is desirable. The debate has also been interesting from the quite different standpoint that the airing of the disagreement in public can be interpreted as a sign of the importance assigned to the ISTC proposal by influential people who customarily make their points on policy without making waves.—JOHN WALSH

NASA Says FAA Understates Air Crash Risk

But ironically, the report could hurt FAA's efforts to expand air traffic controls around the nation

The number of near crashes of airplanes at busy airports could be 12 times higher than the Federal Aviation Administration (FAA) says it is, according to a draft study by the National Aeronautics and Space Administration (NASA). The study implies that pilots fly more safely when they are on their own than when they are guided by air traffic controllers. A copy of the study, which is now being circulated in government agencies for comment, but has not been publicly released, was obtained by *Science*.

"This runs contrary to our understanding of near collision trends and to the accident experience [data] of the FAA," FAA administrator Langhorne Bond told *Science*. "We're not just going to comment on this; we're going to set up a committee or working group to study the problem."

The FAA, which operates all air traffic control facilities in the United States, is

engaged in a controversial bid to drastically increase air traffic control at airports around the country. It would also bring planes now flying at intermediate altitudes on their own under the control of ground radar. The plan would increase the budget and authority of the FAA. Private pilots and their associations, who feel the FAA overregulates them already, are strongly opposed to it and have testified on the subject before Congress.

The study found that in "terminally controlled areas" (TCA's), where all air traffic is controlled from the ground, near midair collisions (NMAC's) occur at a rate of 24.3 per million operations, whereas the FAA official figure is two per million operations. This makes the FAA estimate 12 times lower than the NASA one.

In airports using voluntary ground control systems, known as terminal radar

service areas (TRSA's), the NASA study found 17.4 NMAC's per million operations. The FAA official figure is four per million operations for the TRSA's.

There are fewer NMAC's from 10,000 to 18,000 feet, where air traffic is not now controlled, than either below 10,000 or above 18,000 feet, where it is, the study found. The FAA says, however, that the risk of collision goes down when planes fly higher. At present, most commercial planes fly above 18,000 feet when en route to their destinations and are controlled during their flight. The report speculates that lack of pilot vigilance is the reason for the increased danger in traffic-controlled areas. When pilots fly under ground control, they assume the controller knows more than they do, so they spend less time watching for other traffic. As for the apparent increased risk around airports, "it is unfortunately true that these are also the terminal areas

whose control procedures often require the most attention inside the cockpit, thus making it most difficult to maintain an adequate visual scan for other aircraft," the report says.

The report's unsettling implication—that the skies are safer when air space is less controlled by air traffic controllers—would appear to undercut the FAA case for greater control of air space. The FAA announced its plan late last year, after a commercial 727 airliner collided with a training plane within sight of the control tower of the San Diego Airport. Opponents of the FAA plan dispute that the new FAA rules would have prevented the crash, had they been in force.

Bond has proposed to triple the number of TCA-type airports, from 21 to 65, and to increase the number of airports using the voluntary TRSA controls by 80. (There are now 105.) Finally, planes flying between 10,000 and 18,000 feet would be obligated to follow instructions

that describe several near collisions, which it estimated at 5 percent. But these error margins still do not explain the wide discrepancy between the NASA and FAA estimates.

Many people believe that FAA receives relatively few reports of dangerous air situations because those reporting fear prosecution for negligence. For this reason the Aviation Safety Reporting System was created at the NASA Ames Research Center in California. Under the system, anyone—pilots, crew, or ground controllers—can file a form reporting a dangerous occurrence and in so doing relieve themselves of liability. The researchers at NASA think this is the reason it receives so many more reports than the FAA. For instance, the NASA file shows 1852 reports of NMAC's from July 1976 through November 1978, whereas FAA data show only 484 NMAC's for the year 1978.

Whether the skies would be safer with more controls depends on whose data are correct.

from the ground. The plan has been one of the most controversial in the history of the Department of Transportation: a notice of proposed rule-making concerning it drew a record number of 38,000 comments. The FAA can implement the plan, which also calls for new equipment on board aircraft, after taking into account the comments of interested parties. Foes of the plan hope to get Congress to stop it.

But whether the skies would be safer with more controls depends on whose data are correct. Bond stood up for his agency's data showing the lesser risk of NMAC's. His staff investigate reports of near collisions to find out exactly what happened. "The quality of it is very good but it suffers by not being comprehensive," he said. Many of the situations investigated by the FAA are followed up by punishment of the pilots involved for causing a dangerous situation. The NASA data are of poor quality, Bond says, because names are kept confidential and so individual incidents cannot be investigated, with the result that "In some cases there may be six or seven reports—from pilots, crew, and ground controllers—of one incident."

According to the NASA study, 11 percent of the NMAC's reported might be multiple reports of a single incident. This error is partly offset by single reports

The NASA Aviation Safety Reporting System, whose \$1 million annual budget comes mostly from FAA, has produced other unsettling findings. A previous report on the problems caused by new descent rules led the FAA to cancel plans to require the rules at a number of U.S. airports.

The FAA has decided, effective 30 April, to drop the immunity feature of the Aviation Safety Reporting System. Henceforth, any pilot filing an NMAC report with the system might be liable for prosecution by federal officials, after all. The NASA researchers fear this change will skew their data and lessen the program's usefulness, but Bond argues that the data may be skewed now by the fact that pilots and crew are under pressure from their unions to file large numbers of the reports.

Bond clearly believes that more regulation will make the skies safer. He notes that as ground control has grown, collisions involving commercial planes have all but disappeared. (The San Diego crash was the first since 1972.) On the other hand, private planes, which are less regulated, experience 30 to 40 collisions per year. In the ongoing battle of regulator and regulated, this new NASA study, and the government's investigation of its unorthodox conclusions, will clearly play a role.—DEBORAH SHAPLEY

Scientists Probe Secrets of Sauce Bearnaise

Some European scientists may have had a good chuckle a while ago, when *Nature* published their finding that acetic acid (vinegar) and stirring uncurdled Sauce Bearnaise, the famous egg, butter, and tarragon brew that is notorious for its propensity to coagulate on the stove.

But they have been outdone. An American lipid biochemist and a restaurant chef report in the 5 April *New England Journal of Medicine* that there are other methods for uncurdling Sauce Bearnaise. Their finding may be important for the theory—if anyone cares to learn it—of the chemistry of Sauce Bearnaise. Two Danes and a German, C. M. Perram and J. W. Perram and C. Nicolau,* had reported that the sauce maintains its homogeneity because of the balance of electric charge: the particles are suspended in the solution so long as the ionized acetic acid keeps them in repulsion. The sauce curdles when, due to other changes, this interplay of charges breaks down.

The scientists "proved" their theory by alternately adding onion, egg yolks, butter, parsley, tarragon, herbes de Provence, mustard, and alpine water to various test batches of curdled Bearnaise—all to no avail. But when acetic acid (presumably as vinegar) was vigorously stirred in, "the heterogeneous phase soon assumed the expected homogeneous consistency." Tiens!

But D. M. Small, of Boston University Medical Center, and M. Bernstein, the chef, now report that curdled Bearnaise can be reconstituted by many methods, the best being by "slowly stirring a few drops at a time into a new pan containing a small amount of water" between 40° and 50°C. Thus, acetic acid and ionization are not the sole secret of the smooth sauce. "Interparticle forces" alone are not responsible for "the tasty, complex colloidal system of Sauce Bearnaise. . . . We are evidently dealing with a sauce, like medicine itself, blended of science and art."

*C. M. Perram, C. Nicolau, J. W. Perram, "Interparticle forces in multiphase colloid systems: the resurrection of coagulated Sauce Bearnaise," *Nature (London)* **270**, 572 (1977).