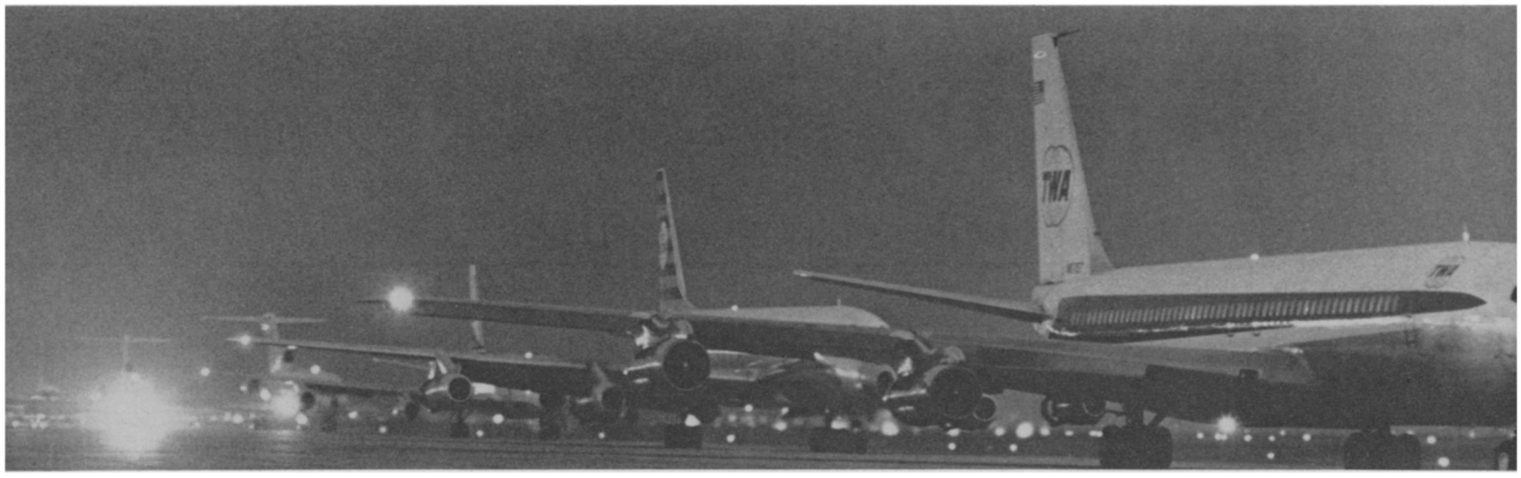


FAA

Jets wait for a runway at Kennedy; there will be a longer wait before new systems can clear the air paths.

Unjamming the airways

While passengers fume in jet airliners circling for hours waiting to land, the equipment that could solve the crowding of the air lanes already exists.

Technology for breaking the air traffic bottleneck is available, but it has not yet been put to use, because it is relatively untested and quite expensive.

The Federal Aviation Administration's Associate Administrator of Plans, Oscar Bakke, says, "if air traffic triples in 10 years, as predicted, then the airspace over airports will be virtually packed with aircraft during many hours. Such close spacing will be possible with precise air navigation and controller surveillance, and a speedier communication system. Electronic aids for creating these new systems are already in existence and familiar to us. We have only to apply them effectively in a live environment."

Computers are now exchanging data between aircraft control centers as well as making many calculations formerly made by controllers. But computerized navigation and communications, including airborne computers on each jetliner, could stack the airspace more closely yet more safely and prevent takeoffs that couldn't land.

FAA intends to install more effective computers which will analyze such information as airspeed, wind speed and direction, and read out an estimated time of arrival to the controller almost instantly.

A new computer recently installed in the agency's Cleveland Center will process over 500 flight plans per hour. In time it will be able to detect hazardous situations and suggest cures.

Contrasting with a current air traffic control center (left) is the new large screen display system under test (right).

The Port of New York Authority

"This does not mean the controller will be replaced," says Bakke, "but that he will be relieved, so far as possible, of making calculations which can be performed faster by machines."

At controlled airports, FAA hopes to install what it calls "Computer Aided Approach Sequencing," in which radar-linked computers will schedule the flow of inbound traffic at shorter intervals than is safe when monitored by the human eye.

Currently the pilot has the burden of calculating his position and reporting by radio to the controller. By the time the information has been relayed, the aircraft may be 10 or 20 miles beyond the reported position. A small computer aboard the aircraft could convert this information into digital form and relay it to the ground in a fraction of a second. Converted again into a visual display, the information would be available to the controller in the blinking of an eye.

The airborne computer could also be used to give the pilot a visual presentation of his computed position, so that he would know his exact geographical location at all times and in all weathers.

The same computer system used on navigation information could handle all types of information from the cockpit to the ground. A pilot's statement of identity, location, air speed, etc.—which might take him several minutes to transmit by voice (once he was able to establish contact with the controller)—could be relayed in digital form in a fraction of a second, and displayed to the controller in any desirable form, including graphic or visual presentation.

With computerized navigation and communication will come an integration of the national airspace system. In the years ahead, FAA hopes to improve the data link between air traffic control facilities so that the entire system will operate as a single unit. Says Bakke, "There is no reason why all information relating to flight throughout the country cannot be passed from computer to computer."

With a fully integrated airspace system, air traffic control facilities would know, for example, before a Washington-bound aircraft left Los Angeles, the exact time it would be possible to land at Washington National Airport, or at Dulles or Friendship. The air speed of the aircraft and the length of scheduled stops could be controlled or modified en route, so that there would be no circling in a holding pattern.

"The next logical step," says Bakke, "would be to integrate surface travel with air travel in the same manner, so that the traveler in the next decade will not be streaking at supersonic speeds one moment 60,000 feet in the air, and dragging along later in an auto traffic jam."

While technologists struggle with the problem of developing improved air traffic control systems, the unprecedented bottlenecks over major airports in recent weeks have precipitated hearings by the House Government Activities Subcommittee. Chairman Jack Brooks (D-Tex.) says the hearings will be "limited to the immediate problem of delays in air travel that have been particularly noticeable in recent weeks."

Brooks' staff has been looking into such long-range solutions as new air traffic control systems for some time. Staff Administrator Ernest Baynard says, "The FAA has to be certain that any new air traffic control system that it wants to install will be effective, workable and safe. Too many lives and too much money are involved for the system to be otherwise. The development of new air traffic control systems takes time." Many of today's airline passengers will ruefully agree.

TRANSPLANTS

High success in Texas

No statistician would lend much weight to conclusions drawn from as select and tiny a sample as the recipients of human heart transplants. The operation is certainly not routine and each is pretty much a case unto itself.

Nevertheless there is a box score building up which, while not proving anything, suggests a lot.

There have been, as of Aug. 1, 28 transplants of human hearts. Eight of them, by far the largest single group, have been done by a surgical team under Dr. Denton A. Cooley of St. Luke's Episcopal Hospital in Houston.

Of all the recipients, nine are still alive. Six of the survivors are patients of Dr. Cooley. Three of them are, for heart recipients, long-term survivors. Two have been discharged from the hospital. One has even returned to work.

It might be that Dr. Cooley is a better surgeon than the others. But differences in surgical technique and ability would most affect the performance of the transplanted heart, and most of the recipients who died were victims either of infection, rejection, already diseased organs, or unsuitability of the donor.

None of these are problems of the knife; the first two are laid to mistakes and misfortunes in patient management, the last two to poor circumstance.

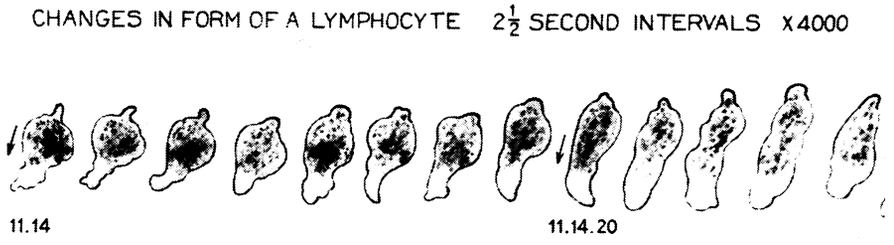
The uniformity of the Texas success is believed to be attributable to a treatment that has gained acceptance since last December when the first operation was done in South Africa. Transplant recipients now are given injections of anti-lymphocyte globulin, ALG, along with chemotherapy designed to suppress the immune reaction and thus control the recipient's rejection of the foreign organ (SN: 5/18, p. 474).

It is significant that while many of the recipients did not receive ALG, at least at first, all of Dr. Cooley's patients were treated with it from the start. The French transplant recipient, operated on May 12 and doing well, has also been given ALG therapy.

The longest-lived recipient, Dr. Philip Blaiberg, was operated on in January in Cape Town and did not receive ALG. At the time it wasn't considered for use in heart transplants. Dr. Blaiberg's quick recovery and early discharge were attributed to his excellent general health and delicate management by surgeon Christiaan Barnard.

Early in July, however, Dr. Blaiberg fell seriously ill with liver and lung trouble, complications resulting from the immunosuppressive chemotherapy he has been receiving. He was given ALG, and Dr. Barnard credits the treatment with Dr. Blaiberg's subsequent recovery.

Dr. Cooley is unequivocal about attributing the progress of his three longest-lived patients to ALG. And at a meeting of 11 of the 16 heart transplant surgeons in Cape Town in mid July, it



Amoeba-like lymphocytes, apparent villains in the transplant rejection.