Driveto Reduce Aircraft Sound
Launched by Aviation Industry

85 Billion Passenger-Miles Flown
By Scheduled Airlines Since 1926

The scheduled airlines of the United States have flown more than 85 billion passenger-miles—the equivalent of a giant airlift transporting every living human on earth a distance of 34 miles—since civil aviation was officially recognized by Congress 27 years ago.

Since the Air Commerce Act was passed in 1926—23 years after the Wright Brothers' first flight—air transports built by the American aircraft industry have consistently set the pace in the world air commerce.

Flew Million Miles in '26
From a measler beginning in 1926, when the eight certificated companies engaged in carrying revenue passengers flew 5,782 passengers a million miles, the scheduled airlines have grown to the point today where they carry 55 per cent of all first class travel within the United States.

Operational Changes
Already, as a result of voluntary cooperation by aviation groups, more than 25,000 transport training flights have been transferred from major terminals in the New York area to outlying airports. Vigorous day-by-day action is emphasized by NATCC in readjusting flight procedures and operations. By taking such action, air personnel maintain constant touch with chief controllers, chief pilots, airport operators and government researchers are investigating means of reducing engine sounds at their source.

Wide Cooperation
The national campaign, undertaken slightly more than a year ago, has—according to Civil Aeronautics Administration—brought together "all elements of the industry that can make some contribution" toward sound abatement.

In the New York area—a hub of worldwide air activity, where sound abatement measures have a high priority because of the unequalled volume of air traffic and the high-density populations surrounding its airports—a special group, the National Air Transport Coordinating Committee, has been established to coordinate the wide-scale sound-reduction program.

The NATCC activity in New York is expected to set a pattern for other such programs throughout the nation. It has involved, according to its executive director, Vice Adm. C. F. Rosenahl, "the most far-reaching adjustments of air operational procedures ever undertaken by the air industry."
The Nation Learns A Lesson

A Healthy Industry—Key to Security

by DeWitt C. Ramsey [Adm., USN, Ret.]
President, Aircraft Industries Association

Recent events have shown that the nation has profited from the experience of the past—and at last has come to an appreciation of the waste and inefficiency inherent in repeatedly destroying production potential, then attempting to re-create it overnight.

While appearing before Congress in recent weeks, Defense Secretary Charles E. Wilson has spoken emphatically of the need for maintaining the health of the aircraft industry in peace as well as in time of war, a time when it appeared that the cease fire negotiations in Korea would bring a successful conclusion, Mr. Wilson made it clear that it would be his purpose to eliminate by any feasible means the peak and valley character of effort which has militated against the efficient and economical operations of the aircraft industry in the past.

On Armed Forces Day, he reiterated that “an essential part of the mobilization base” is a “healthy aircraft manufacturing industry so that its potential production capabilities are reasonably retained over a period of years.

The history of aircraft production effort in the United States has been one of abrupt and massive mobilizations, followed by precipitate demobilizations.

The cost of this up-and-down, stop-and-start production history has been fantastic. It has meant, on recurrent occasions, the rebuilding of factories, the re-tooling of plants, the re-hiring of technicians, the re-training of workers. And it has, of course, had a spiraling effect on the cost of the aircraft required for national defense.

A unanimity of thought prevails throughout the nation today on the need for long-range programming. Members of the Congress have strongly supported a program of consistent, long-range aircraft procurement as one of the most important means of attaining additional military economies. Several months ago, the Senate Preparedness Investigating Subcommittee, headed by Sen. Lyndon Johnson, recommended that steps be taken “to maintain the aircraft industry in a healthy state in periods of peace as well as in periods of defense mobilization.” The subcommittee pointed to the inefficiency stemming from the “off-again, on-again, gone-again” scheduling of the past.

In the late 1940’s, the Congressional Aviation Policy Board called for a “five-year plan for aircraft procurement” as the “most efficient method of stabilizing procurement and of promoting a healthy industry available for mobilization in an emergency.” Shortly before this report was issued, the President’s Air Policy Commission asserted that “year-to-year and inefficient aircraft production which has been forced upon the services by current budgeting practice must give way to long-term planning.”

And only last year, the Defense Department reported that “hasty and excessive mobilization, as well as hasty mobilization, greatly increases costs, unnecessarily disrupts our economy, and generally tends to increase the demands of the military services, which have experienced again and again the painful process of feast and famine.”

Whatever the outcome of the current deliberations in Congress on the strength levels of United States military services, certainly all Americans appear to agree with President Eisenhower’s recent statement that “... our strength, which is already very real, must now be made stronger, not by inefficient and expensive starts and stops, but by steady and continuous improvement.”

In the knowledge that weakness at any time is an invitation to aggression, the President has said that U. S. military policy “will not be tied to any magic critical year... but will be based on the sounder theory that a very real danger not only exists this year, but may continue to exist for years to come.”

Streamlined Aircraft Deceptive; Thousands of Parts Under Skin

Every cubic inch underneath the skin of today’s military aircraft is crammed with equipment needed to guarantee the efficiency and accuracy of the plane, and the safety of the pilot. The streamlined exterior of a typical fighter hides thousands of parts, without which it would be unable to fly and fight in today’s sonic era.

A typical jet fighter airframe contains about 13,000 manufactured parts.

These are exclusive of the thousands of parts in the engine, electronics and armaments systems, and other components furnished by the military services.

In addition, the airframe contains thousands of standard items—such as screws, bolts and rivets—and countless components purchased in an assembled state.
Sound-Abatement Drive Launched

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managers, airline executives and others concerned with the project. A special Technical Committee, part of NATCC, meets at least once a week to discuss new proposals and review measures already adopted.

Executive Director Rosendahl has pointed out that the "same technology that made the new airplanes possible from which the aviation industry sprang in so brief a period of time" is now being devoted to "constant and comprehensive effort toward the objective of sound abatement. Measured by any standards, civil air traffic control and the greatest developments in the entire history of the United States. The present program's already enviable progress can be attributed, I believe, to the voluntary joint action on the part of every segment of the aviation industry and related governmental agencies."

Preferential Runways

Thus far, a primary effort of NATCC in the New York area has been for operation. For example, a system of preferential runway use has been established, with priority given to runways leading generally over water or industrial areas. Within safety limitations, the system has reduced the number of take-offs and landings on runways which would lead over densely-populated areas.

The success of this system is indicated by the fact that, even during the months when the year's worst weather conditions prevailed, well over 40 per cent of all take-offs and landings at the three major New York airports were made on these preferential runways.

Limits Ground Sounds

Another general operational rule introduced by NATCC requires pilots to climb to 1,200 feet as fast as possible following take-off, a practice which reduces the sound level on the ground. Prior to landing, pilots retain 1,200 feet of altitude as long as possible, eliminating many low-drag-in approaches.

While emphasizing these in-flight procedures, NATCC has taken a series of positive steps to limit sound of engine run-ups on the ground. Areas for maintenance run-up have been established where resultant sounds can be most effectively controlled. In addition to restricting engine run-ups to parts of the airports, an effort is also being directed toward gaining maximum use of present and future buildings and field facilities as sound barriers.

New Runways

With readjustment of operating procedures under continuing review, a series of new and improved runways has been placed in operation at New York airports at a cost of several millions of dollars. Their use has made possible elimination of additional flight paths over surrounding populated areas.

Each of these steps, undertaken in the community program, has involved the active cooperation of some 25 major operators of aircraft, 7,500 scheduled airline pilots plus thousands of other pilots, the Civil Aeronautics Board, the Civil Aeronautics Administration, the Port of New York Authority, the Air Line Pilots Association, and other elements of the aviation industry.

All Groups Cooperate

NATCC itself is supported by the above groups, as well as by the Aircraft Industries Association, the Air Transport Association, the Airport Operators Council, the American Association of Airport Executives, the Corporation Aircraft Owners Association, the Aircraft Owners and Pilots Association, the Air Coach Transport Association, and the Independent Military Air Transport Association. In January of this year, heads of major airlines and representatives of other aviation groups met in New York to examine all aspects of the aircraft sound reduction program, and to lay plans for continuing efforts.

Service Center

A major contribution toward the industry cooperative drive has been given by NATCC through establishment of a complaint center designed to work directly with residents of areas near New York airports. In the knowledge that the desire for constructive sound abatement practices by residents of communities which are damaged equally by the aviation industry, NATCC set up a central clearing-house to receive all phone calls and messages concerning aircraft sounds. On receipt of the calls, the aviation industry representatives institute immediate "follow-up" action, notifying aircraft operators and airports of specific needs for corrective action or new sound reduction practices.

Sponsoring Studies

With the New York area serving as a pattern region for operational readjustments, other national activities are coordinated by a CAA National Aviation Noise Reduction Committee. The Administrator of Civil Aeronautics reported recently that "the Aircraft Industries Association, the National Advisory Committee for Aeronautics, the Massachusetts Institute of Technology, the Navy and the Air Force are among those sponsoring studies, tackling such diverse aspects as noise-measuring instruments, mufflers, water absorption, after-burners, etc." The CAA's national committee has a subcommittee on Aircraft and Powerplant Design and Research, which is keeping in close touch with all these developments so that all groups can be made aware of what has been done, and what still needs to be done.

Sound Control Committee

Aircraft manufacturers, working through the Aircraft Industries Association, have set up a Sound Control Committee, and are working on design, construction and use of suppression devices for ground operation of jet, rocket and supersonic propeller-driven aircraft and engines. Conferences are held regularly to pool knowledge of manufacturers, government agencies, and scientists engaged in vigorous efforts to seek practical solutions.

For more than a year, this AIA committee has been working on a wide series of recommendations for a research program aimed at easing the external sound of aircraft.

Long-Range Research

At manufacturing centers themselves, aircraft and engine industries have released engine run-up areas and have oriented the directional pattern of propeller sounds in such a way as to give maximum sound-reduction to residential areas. At many plants, high-cost mufflers have been installed for test work.

To supplement immediate steps intended to lessen sound in airport communities, the Government's National Advisory Committee for Aeronautics has established a Special Subcommittee on Aircraft Noise, doing basic long-range research which can be expected to contribute to future progress.

Survey Shows 1,100 Research Projects

On Aviation Safety

American air transport manufacturers—companies that have built 80 per cent of the high-speed aircraft in use on world airways—have a 50-year history of emphasis on flying safety.

Last year, crowning their efforts, the U.S. domestic scheduled airlines achieved the lowest accident rate (0.38 passengers killed per 100 million miles) ever recorded by commercial aviation.

$60 Million for Studies

And there are 1,100 good reasons for believing this safety mark will be bettered in the future.

Today, more than 1,100 research projects aimed at increasing aviation safety—and representing an annual expenditure of over $60 million—are underway in this country, Canada, and abroad. More than 92 per cent of these projects are being conducted in the United States.

This information is contained in a recent survey of aviation safety research projects, compiled by the Cornell-Guggenheim Aviation Safety Center.

Cornell-Guggenheim Report

The Cornell-Guggenheim report points out that last year's domestic airline safety record was three times better than in 1951—and that for a period of 12 months ending in February, 1953, no fatalities were incurred during the 13,100 passenger-miles flown by the lines, and the 13,000 takeoffs or landings averaged each day.

The advances in air safety are not confined to domestic airlines, the study indicates. During 1952, the Air Force reduced its major accidents per 100,000 flying hours to 29, from the preceding year's 33.

Production Efficiency

By employing a new method of overhead conveyance, one manufacturer now produces two engine components in about one-third the time formerly required, simultaneously slashing parts handling time 60 per cent and manpower 15 per cent.

The Price of Performance

Without complex electronic equipment, flight at sonic speeds would be impossible. These components, required to control high-performance aircraft under combat conditions, are a major factor in the cost of modern planes.

<table>
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<tr>
<th>Plane Type</th>
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<th>Number of Electronic Tubes</th>
<th>Weight of Electronics</th>
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<tr>
<td>Modern Jet Bomber</td>
<td>14</td>
<td>650</td>
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*Source: Typical Aircraft Manufacturer*
**Business Plan Cut Travel Costs Of Corporations**

There is no waiting around the station for the owners of today's 11,000 corporate airplanes. These men fly when they want to and where they want to— and generally do it at an impressive saving in time and money.

In 1952 they logged well over 422 million mile-planes, almost as many as the 457 million mile-planes flown during the scheduled period by the scheduled domestic airlines. In the same year these craft flew nearly 2.75 billion passenger-miles.

**Fifty Million Hours**

In running up these astonishing figures, the corporate aircraft owners flew some 3.25 million hours—equivalent to flying day and night for over 370 years.

These men—and women—operate planes which range from small single-engine aircraft to the newest and largest air transports, equipped with the most modern instruments and automatic aids available.

These aircraft represent a total investment of about $175 million, an expenditure of from $30 to $50 million annually for planes, parts and equipment—and an estimated additional million dollars annually for fuel, oil and maintenance.

**Comparable Costs**

Surprisingly enough, many of the new planes purchased today actually cost less than their counterparts of pre-World War II. One typical four-place business plane now sells for approximately $13,000 (depending upon the amount of instrumentation desired by the purchaser). A pre-World War II four-place—which flew slower, was less comfortable, and was less reliable—sold for just about the same price.

But there is a big difference in the value of today's dollar as compared with the days before World War II. Measured in terms of pre-World War II dollars, the modern four-place is priced at less than $7,000.

2,000 Metals Types Cataloged by NASC

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which distributors and aircraft manufacturers are required to carry.

In compiling the list, distributors, mills, and fabricating manufacturers collaborated to standardize on the exact materials—choosing specifications, hardness, finish and size of metal to obtain the greatest use from the minimum number of types and forms.

The catalog (“Aircraft Metals Stock List, 1953”) includes aluminum alloys, copper alloys, magnesium alloys, carbon and alloy steels, stainless steels and titanium.

It can be obtained from the National Standards Association, 527 Washington Loan & Trust Building, Washington, D.C. Price per copy (in lots of one to four copies) is 50 cents. Lower prices can be obtained for larger quantities.

**Air Quotes**

“I am confident that if we determine to do so we can once again fly ahead of the Soviet Union in the pursuit of scientific and technological knowledge. So, as we do, we can avoid an economically crippling all-out armament race that aims at out-producing the Soviet Union plane for plane. But we must enter an important qualification: we can pursue this policy successfully only while we continue to maintain a modern air force in-being large enough to assure that a Soviet sneak attack will not be decisive, and capable of an immediate devastating counter-attack.

“Our production capacity is one of our great national assets. If we are to take full advantage of it in the future we must detect and design now the equipment that we may wish to mass-produce five or ten years hence. If we do not exercise this foresight, we may one day find ourselves turning out large quantities of equipment that is technically inferior, probably unsuitable, and possibly worthless.”—James H. Doolittle, April 18, 1953.

**Aircraft Employees Get Extra Benefits With ‘Fringe’ Pay**

In addition to his regular pay, the average employee at a typical aircraft plant receives $706.96 worth of “fringe benefits” each year.

This extra compensation—paid by the company—includes such items as paid vacations, paid rest periods, overtime premium pay, $250 in service leaves, workmen’s compensation insurance, company insurance contributions, paid holidays, payroll taxes, and other miscellaneous benefits.

For a typical company, the annual "fringe" payments per employee break down as follows: paid sick leave $20.45, workmen’s compensation insurance $24.99, company insurance contributions $27.26, paid holidays $97.70, shift bonus $102.24, payroll taxes $113.60, paid vacations $124.96, paid rest periods $197.67, overtime premium pay $301.28, miscellaneous benefits $6.81.

**Frigid Tests**

Man-made blizzards, with temperatures dropping as low as minus 50 degrees and winds blowing with hurricane force, will be created on the West Coast this summer to test new aircraft and equipment.

Engineers will create the sub-zero fury in an “icing wind tunnel,” first of its type to be constructed in the West. The 9,000-foot-long tunnel will require the equivalent of enough refrigeration to chill 776 home refrigerators.

**In One Day, Airline Fleet Could Fly Equivalent of 65 Times Around Globe**

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not enough mail to make a full load.

The entire passenger fleet of that first year of certificated air transport could carry but 112 passengers at one time and had a capacity of only 28,875 plane-miles per day.

**Now Carry 88 at 328 m.p.h.**

The luxury U.S. flag transports criss-crossing the seas and nations today carry as many as 88 passengers at speeds ranging up to 328 m.p.h.—and can fly up to 1,622,100 plane-miles in a single 24-hour period, nearly 65 times around the world at the equator in a day.

In 1926 there were no certificated international passenger airlines. Last year over 2.3 million passengers flew to the four corners of the world in transports flying the American flag.

While developing this sensational history of commercial aviation, more economical airplanes have made possible a steady reduction in the cost of air travel. The average passenger fare in 1926 was 12 cents a mile. Now, with planes more luxurious, faster and safer, the cost is only 6.1 cents per mile—about one-half the old fare. And tourist or coach flights cost even less.

**Air Mail Keeps Pace**

The growth and world-wide development of airmail and air express has been in keeping with this rapid progress of passenger transportation. In 1926, with but 28 cities certified for service, airmail cost 10 cents an ounce for distances up to 1,000 miles. There were proportionate increases for points beyond that radius.

A letter sent from coast-to-coast took 32 hours in those early days and the rate was 35 cents an ounce. The same mail today is sped across the continent in 10 hours and costs six cents an ounce. The present six-cents-per-ounce rate will deliver a letter between any two points in the United States, its possessions and territories, and Canada and Mexico.

It is estimated by the Post Office Department that 53.7 billion air mail pieces will be handled in 1954—equal to 329 pieces of mail for every person in the United States—more than is handled by all the rest of the world.

**Aircraft Weight Mounts As Performance Rises**

It takes heavier materials and vast increases in equipment for modern jet aircraft to fly at sonic speeds. As plane performance has increased in the past 20 years, gross weight of aircraft has risen proportionately. This greater weight is a major factor in aircraft costs.

Twenty years ago, the average fighter weighed about 5,000 pounds. Today’s jet fighters gross in the neighborhood of 50,000 pounds.

Weight of the average bomber has increased at an even greater rate. A typical modern bomber grosses about 200,000 pounds—some 13 times heavier than the 15,000 pounds of 20 years ago.