AIA CONFERENCE STRENGTHENS LATIN TIES

Aviation Export Problems Aired

By Mundy I. Peale
President, Republic Aviation Corp.,
Honorary Chairman, AIA Export Committee

The premise of international trade is as simple as a housewife's transaction at a supermarket: One party wants to buy; the other wants to sell.

But this simple premise quickly gives way to a complicated and often frustrating pattern in the hard realities of export and import trade.

The high purpose of the Latin American Aviation Conference sponsored by the Export Committee of the Aircraft Industries Association, held on mutual problems as financing, procurement and availability of aircraft and equipment. Both Latin American and U.S. leaders termed the conference a success. Shown at the conference are (left to right): General Robert H. Landon, Commander of the Caribbean Air Command, Admiral De Witt C. Ramsey, Major General Truman R. Landon, Commander of the Caribbean Air Command, Admiral De Witt C. Ramsey. (USN-Res.), Vice Chairman, Board of Governors, Aircraft Industries Association, Mundy I. Peale, President, Republic Aviation Corp. and Honorary Chairman of the AIA Export Committee, General Albin Solminihc, Chief of Staff of the Chilean Air Force, Charles Shuff, Westinghouse Electric International Corp., Chairman of the Export Committee.

‘Water Squeezer’ Halts Jet Aircraft In 300 Feet Without Damage

Engineers have developed a novel “water squeezer” for halting high-speed jet planes in less than 300 feet without damage to aircraft or landing gear. The device, which absorbs the energy of the landing aircraft, is expected to be delivered to military services in the near future. The “water squeezer” operates as follows: As the jet plane lands, the device engages with a block one of two cables stretched across the runway. The cable is attached to a piston in a water-filled pipe. As the engaged plane rolls forward along the landing strip, it pulls the piston through the water, absorbing the plane's energy and thus bringing the aircraft to a halt.

Called an “expeditionary arresting gear” because it can be easily and quickly dismantled and moved to quickly-dismantled and moved to forward areas by helicopter or cargo forward area plane, the device is suitable for landing modern, high-speed jet aircraft. No adjustment of the arresting gear is necessary for different landings or slugging speeds. Experiments are currently under way looking toward eventual adaptation of the device for use as safety barriers at commercial and military airports.

The “water squeezer” is also being used at a Western Air Force base to halt a high-speed test sled which in turn is used to test pilot ejection seats for military aircraft.

This development by the aircraft industry will save the substantial sums required to build longer runways needed to handle high-speed jet aircraft.

In still another novel development for testing aircraft arresting gears, engineers have built a four-jet-engine “hot rod” car which simulates high-speed jet aircraft landings.

The bright red “hot rod” will never interfere with auto traffic, nor give sleepless nights to the highway patrol, however, since it rides a steel "I" beam along a 5,000-foot track. Because of its four high-performance jet engines, the "hot rod" can attain the speed of a landing jet aircraft and at the same time pull (See JET, Page 8)

Nuclear Reactor Tests Effects of Irradiation On Aircraft Parts

Work on nuclear-powered flight has reached the point where irradiation effects on aircraft and components are being tested in a nuclear reactor which simulates high altitude conditions.

Irradiation cells on two sides of the reactor will be equipped with environmental chambers capable of simulating high altitude conditions. With this arrangement, tests can be run to determine the behavior of materials and components under varying thermal and radioactiv condition in flight by types of aircraft now under consideration.

While expensive, such testing of aircraft parts, materials and components is vitally necessary because of the radically different nature of nuclear flight. Flight ranges will be imposed only by the amount of radiation materials that flight crews can safely absorb. Refueling will be almost non-existent as a problem. The nuclear-powered plane can stay aloft as long as its crew holds out, according to the best estimates of scientists and engineers working on the project.

LATIN AMERICAN AVIATION CONFERENCE, sponsored by the Export Committee of the Aircraft Industries Association, at the Bal Harbour Hotel, Miami Beach, Fla. Discussion was held on mutual problems as financing, procurement and availability of aircraft and equipment. Both Latin American and U.S. leaders termed the conference a success. Shown at the conference are (left to right): General Robert H. Landon, Commander of the Caribbean Air Command, Admiral De Witt C. Ramsey, Major General Truman R. Landon, Commander of the Caribbean Air Command, Admiral De Witt C. Ramsey. (USN-Res.), Vice Chairman, Board of Governors, Aircraft Industries Association, Mundy I. Peale, President, Republic Aviation Corp. and Honorary Chairman of the AIA Export Committee, General Albin Solminihc, Chief of Staff of the Chilean Air Force, Charles Shuff, Westinghouse Electric International Corp., Chairman of the Export Committee.

‘Water Squeezer’ Halts Jet Aircraft In 300 Feet Without Damage

Engineers have developed a novel “water squeezer” for halting high-speed jet planes in less than 300 feet, without damage to aircraft or landing gear. The device, which absorbs the energy of the landing aircraft, is expected to be delivered to military services in the near future. The “water squeezer” operates as follows: As the jet plane lands, the device engages with a block one of two cables stretched across the runway. The cable is attached to a piston in a water-filled pipe. As the engaged plane rolls forward along the landing strip, it pulls the piston through the water, absorbing the airplane’s energy and thus bringing the aircraft to a halt.

Called an “expeditionary arresting gear” because it can be easily and quickly dismantled and moved to quickly-dismantled and moved to forward areas by helicopter or cargo forward area plane, the device is suitable for landing modern, high-speed jet aircraft. No adjustment of the arresting gear is necessary for different landings or slugging speeds. Experiments are currently under way looking toward eventual adaptation of the device for use as safety barriers at commercial and military airports.

The “water squeezer” is also being used at a Western Air Force base to halt a high-speed test sled which in turn is used to test pilot ejection seats for military aircraft.

This development by the aircraft industry will save the substantial sums required to build longer runways needed to handle high-speed jet aircraft.

In still another novel development for testing aircraft arresting gears, engineers have built a four-jet-engine “hot rod” car which simulates high-speed jet aircraft landings.

The bright red “hot rod” will never interfere with auto traffic, nor give sleepless nights to the highway patrol, however, since it rides a steel "I" beam along a 5,000-foot track. Because of its four high-performance jet engines, the “hot rod” can attain the speed of a landing jet aircraft and at the same time pull (See JET, Page 8)

Nuclear Reactor Tests Effects of Irradiation On Aircraft Parts

Work on nuclear-powered flight has reached the point where irradiation effects on aircraft and components are being tested in a nuclear reactor which simulates high altitude conditions.

Irradiation cells on two sides of the reactor will be equipped with environmental chambers capable of simulating high altitude conditions. With this arrangement, tests can be run to determine the behavior of materials and components under varying thermal and radioactiv condition in flight by types of aircraft now under consideration.

While expensive, such testing of aircraft parts, materials and components is vitally necessary because of the radically different nature of nuclear flight. Flight ranges will be imposed only by the amount of radiation materials that flight crews can safely absorb. Refueling will be almost non-existent as a problem. The nuclear-powered plane can stay aloft as long as its crew holds out, according to the best estimates of scientists and engineers working on the project.

He Conference afforded a forum for civil and military aviation leaders from 12 Latin American republics to meet with the U.S. and U.S. industry representatives, U.S. Air Force, civil agencies of the federal government concerned with aviation, and present their problems and recommendations. The Latin American delegates to the conference were articulate and, more important, frank spokesmen in presenting their opinions and desires.

Robert F. Smith, general manager of the Costa Rican airline, LACSA, set the keynote of the conference on the opening day.

"Our first problem is financial," he told the conference. "We are going to have to renew our domestic and international air traffic at a cost several times our combined net worth... We can and will attract new investment capital in each of the countries without necessarily increasing government ownership. However, we cannot expect to meet all our capital demands with equity issues. We must obtain financial credit from aircraft suppliers and commercial and international banks at reasonable terms. The most logical collaborators with suppliers and buyers of aircraft equipment in the future needs of Latin American (See MEETING, Page 7)
The quantitative analysis upon the idea of using tin cans which would result in storage sections of a wind tunnel that eight giant steel spheres, each 36 degrees Fahrenheit during a test blow. The cans fill about 200 degrees Fahrenheit during a test blow which would result in serious errors in test data. Aircraft industry engineers hit upon the idea of using the tin cans—enough to fill 135 boxcars and weighing 152 million pounds—which hold the temperature drop to 30 degrees. The new wind tunnel, first of its kind, costs $5 million and was designed, built and financed by an aircraft company. The single tunnel provides for research in the subsonic (less than the speed of sound), transonic (through the speed of sound), and supersonic (past the speed of sound) ranges. The investment in this valuable research tool insures the qualitative superiority of American air power.

MATS

2

the situation says, of the estimated 45,860,000 passengers more than 27,760,000,000 passenger miles with a fatality rate of only 0.62 per 100 million passenger miles in 1956 as against 0.76 in 1955. A passenger mile is one passenger flown one mile.

The Civil Aeronautics Administration, responsible for the compilation of these remarkable statistical facts on air travel safety, also pointed out (as a chart on page 8 of this issue indicates) that this nation's international air carriers flying more than 7,000,000 passengers over 117,000 miles of air routes have not experienced a fatality since March 1955—a perfect safety record for 21 months.

Providing safety for the air traveler is the prime objective of the airline operator, the aircraft industry and the government. In this regard, along with the airlines operations and maintenance personnel, the thousands of engineers in the aircraft industry are probably the most safety conscious. For, in the final analysis, it is the aircraft manufacturer and his team of engineers who are responsible for making the airliner one of the safest means of public transportation. By and large, their efforts are overlooked because the air traveler simply knows—and expects—that his safety "is being looked after."

Mechanical and technological advances in airline safety are not, for the most part, apparent to the passenger. They include a host of developments among the more notable of which are: automatic feathering and reversible pitch propellers, anti-skid braking, steerable nosewheel, high strength nylon cord tires, very high frequency communications, omni-range navigation, ground controlled approach instrument landing systems, thermal anti-icing systems, evolutionary improvement of engines, cockpit standardization, improved exterior lighting, fire detection and extinguishing systems, and many others.

There is little wonder then that more than 45 million safety-conscious, comfort and economy-wise travelers turned to the airlines instead of the two-and-one-half times as many traveled by air in 1956 as traveled by air in 1950.

Your safety is on the skyways. This is the fact of the matter.
GETTYSBURG, Pennsylvania, is a pleasant little town famed chiefly for an event in its past—the Battle of Gettysburg, which turned the tide in the Civil War.

Out at the Gettysburg Airport, however, an event takes place nearly every weekend, which in a way has the battlefield beaten hollow as a tourist attraction.

Tourists who have come from far and near to walk over the famous battlefields at Gettysburg are beginning to realize that it is worth their while to stop in at the airport on weekends for Gettysburg's other big attraction.

They sit in their cars, or stroll along the edge of the field, watching the horizon to the south. After a while, their patience is rewarded by the sight of a small, two-engine airplane which makes a brisk turn over the field, then sets neatly down and rolls toward a waiting limousine.

As the propellers come to a stop, the doors swing open, and out steps Dwight D. Eisenhower, President of the United States—the first President ever to hold a pilot's license, with less than four engines.

Gettysburg's No. 1 citizen has returned to his farm for the weekend, and the tourists get him.

The fact that the President uses a small business plane for the 80-mile trip between Washington and Gettysburg is just one more accepted way of travel for people whose jobs forms of locomotion.

The postwar growth of the airlines is a well-known story. The mighty upsurge of military aviation often makes front page news. But general aviation has also made amazing progress—progress which is not nearly so well known.

Today, general aviation—all civil flying except the scheduled and nonscheduled air-
GENERAL aviation's fleet outnumbers the total number of airliners by at least forty times. Aircraft used for business purposes alone outnumbers the nation's fleet of airliners fifteen times.

During 1955 (the last year for which complete statistics are available), business aircraft flew an estimated 4,300,000 hours—a million more hours than were flown by all the domestic airlines.

Deliveries of new aircraft for general aviation—a significant yardstick in measuring the growth of general aviation—have been on the increase. In 1954, 3,073 new airplanes were delivered; in 1955, 4,434; and over 6,000 in 1956.

Today, general aviation itself is a major business, and one which, through its very nature, makes substantial contributions to the national economy and defense through speeding the transportation of materials, equipment, and key personnel.

Substantial contributions to the nation's agricultural economy are also realized through the utilization of general aviation. The Civil Aeronautics Administration and agronomists, working with the Department of Agriculture, estimate that the use of aircraft by farmers and ranchers, both as a means of efficient transportation and as a valuable agricultural tool in chemical dusting and spraying, has added approximately $3,000,000,000 a year to farm income.

In spite of these facts, general aviation today is woefully misunderstood by the general public and by some military, airline, and key government aviation planners.

GENERAL aviation is not, despite the picture in the popular mind, solely for pleasure or sport. Actually, less than 22 per cent of general aviation flight time is occupied in pleasure or sport flying, according to current CAA statistical data.

The active fleet of aircraft used primarily for business purposes is now estimated to exceed 20,000 planes, and a measure of the importance of aircraft to the industrial economy lies in the fact that 90 of the nation's 100 largest corporations now operate one or more aircraft.

A recent CAA study estimates that general aviation will increase in scope by an average of 400,000 hours a year through 1960, which would raise annual flying hours for general aviation to 11,500,000 by that time. Many qualified spokesmen for industry feel, however, that this growth estimate by CAA errs on the side of caution.

General aviation has more multi-engined aircraft operating in airline-type IFR flying than the airlines, and large numbers of single-engined airplanes are adequately equipped for this type of flying. It is not unusual for a small business airplane to have a price tag on its instrumentation equal to one-third of its total cost.

Because of its lusty growth, general aviation is potentially, if not already, the largest user of the nation's "magic web" of interconnected airways, and constitutes the largest civilian market for modern airborne communications and navigation equipment.

Business fliers are discovering that, in order to make the most efficient use of their aircraft, they must be equipped with radio, instruments, and electronic navigating aids. All aircraft regularly engaged in cross-country, which enable their pilots to maintain communications with air traffic controllers. More and more planes in the business fleet are being equipped with these devices. Already the business fleet has more auto-pilot installations than the nation's airlines.

ALTHOUGH we live on the bottom of an ocean of air seemingly so vast that it has ready running out of room. The skies are—military, airline, and general—and there is traffic cops.

These planes occupy the same air space at the same time, traveling to and from the same destinations, and utilizing the same ground facilities. On the ground, the difference in size between a typical general aviation aircraft and a civilian transport or a military bomber seemingly makes the general aviation plane an insignificant gnat.

In the air, however, it is a very different story. Such differences in size or dimension shrink to nothingness, and all aircraft necessarily become equal as units moving through space.

Methods for sorting and controlling the burgeoning air traffic over America have lagged behind the rapid rate of increase in air transportation and aerodynamic progress. We are thus in danger of running out of "free air."

THERE is no ready-made solution to the problem, which is now recognized to be of great urgency and of national importance. President Eisenhower noted the magnitude of the problem when he said, in appointing Edward P. Curtis, an Eastman Kodak Company official, as his Special Assistant for Aviation Facilities Planning: "I am taking this action because the rapid technical advances in aviation and the remarkable growth in the use of air transportation have confronted the nation with a serious aviation facilities problem. Modern aircraft can be operated in the numbers required in the national defense and in the civilian economy only if airports, navigation aids, air traffic control devices, and communications systems are suitable for their needs."

The President went on to say that to delay formulation of a plan to solve this growing problem is "to invite further congestion of the air space, needless hazard, economic loss, inconvenience to users, and possible impairment of the national security."

The progressive growth of general aviation is endangered by the problems enumerated by the President—airways congestion, crowded control zones, insufficient airports, and inadequate communication and navigation aids. Piled on top of these are still another set of circumstances which bode ill for the future—general aviation has been virtually a stepchild in the thinking of key government planners, mainly because the needs and desires of the civilian transport carriers and those of
military aviation are better known and are thus considered paramount.

One method of helping to solve this "aerial logjam" is the establishment of numerous small airports. This would not only relieve congestion at the country's larger airports, but would also serve to open up whole new areas to the air age. Even at this late date, there are large areas of the United States, both rural and urban, which are inaccessible by air. In fact, it has been estimated that only one-third of the continental United States is air accessible today. The airlines make only about 625 localities accessible for air travel. Yet, there are at least 15,000 incorporated urban areas in this country.

If these flight strips were laid out alongside the new interconnecting network of federal highways, the increased safety factor alone would more than justify their cost. Establishment of those landing strips would mean that a useful landing facility would always be near at hand. This would prove a boon, not only for general aviation, but for the airlines as well, which could, under emergency conditions, safely land a medium-sized transport on one of the flight strips.

Flight strips would also prove of incalculable value for Civil Defense operations in time of emergency. With flight strips located alongside major highways, and near settled portions of the country, both large and small communities, as well as villages and hamlets, every part of America would be accessible by air, even if road and railway facilities were destroyed or jammed by enemy action.

Similarly, such flight strips would immeasurably ease the loss of life which occurs durably from earthquakes, such natural catastrophes as floods, fires by enabling relief agencies to reach affected areas, and chilling to the disaster scene. Until a system of flight strip airports is built, airport congestion will grow worse. Stead of general aviation is stead of better, because general aviation is.

incisive statements on the growth of general aviation was voiced recently by Henry W. Boggess, President of the National Business Aircraft Association.

"Thanks to the airplane," said Mr. Boggess, "a change akin to revolution has taken place in American business methods... Prior to World War II, most industries in this country operated what might be loosely termed 'centralized organizations.' There has been a transition to 'decentralized operations' which has been more extensive and more rapid than seems to be generally realized.

"This trend to decentralization has quite naturally caused demands for faster means of travel. No longer is the businessman content to spend three or four days traveling in order to do one or two days of productive work. He has learned that he can use the airplane and double—often quadruple—his productivity."

Hundreds of key executives agree heartily. In case after case, business men have reported that the purchase and use of an airplane—or even a fleet of airplanes—has tremendously increased productivity.

In a typical statement, the president of a midwestern engine component and accessories manufacturing firm reported: "We have been operating our own airplanes for about 25 years, through all of which time we have considered them essential machine-tools to our business. We feel the cost of airplane operation is justified on several counts, among which we include the conservation of the energies and time of our key personnel; the tremendous advantage to them of being independent of public transportation schedules, which improve their efficiency of serving the customers and our company. It also makes it possible for these people to spend more time at home and still do their job, which is a real 'fringe benefit.'

"We are able to go efficiently to places not served efficiently by public transportation. And emergency shipment of products and parts is not uncommon occurrence."

The businessman who is considering aviation as a useful tool in his occupation would
do well to take up the matter with the commercial air service, or "fixed base" operator in his locality.

The fixed base operator, himself a businessman, not only understands aviation from A to Z, but understands the problems and special needs of business as well.

Fixed base operators operate air taxi services, conduct aerial dusting and spraying operations, train pilots, handle maintenance, overhaul and repair of aircraft, conduct aerial photographing, advertising and patrol assignments from customers, and, importantly, act as sales representatives for aircraft, engines, accessories, and equipment.

Many businessmen-pilots have become aviation enthusiasts through casual contact with a fixed base operator. There are instances of manufacturers whose assembly lines were threatened with a closedown for want of spare parts or because certain tools had broken. When they learned they could charter a plane, they fly to Detroit, or Milwaukee, or Birmingham, or Los Angeles for repairs and have their factories humming before nightfall, they began to appreciate the wonders of the air age.

Another group of businessmen—well-paid businessmen, at that—don't need to be sold on the merits of flying for their cross-country trips. This would be the Brooklyn operations. This would be the Brooklyn Dodgers, or the "Bums," as they are lovingly called by the citizens of Flatbush. The Dodger pilots purchased a 44-passenger executive transport for transporting the baseball team to out-of-town games. The plane will also be used to transport three Dodger farm clubs to Montreal, St. Paul, and Fort Worth, according to Dock O'Malley, who is president of the Flight Club.

In addition to its use as a means of executive transportation, the airplane is daily adding to the utility of industry in many other areas. Aircraft are being used to patrol oil fields, to make geophysical surveys and pipelines, to make aerial mapping and surveys, for aerial advertising, and for conducting aircraft traffic control for directing automobile traffic from the air. The airplane is an extension of the air force's own ground control of aircraft. The airplane is used by the State of South Dakota as an aerial survey plane to cover the 18-county area, reporting that "It will cost no more than the seven cents a mile now paid to employees for the use of their cars, flown 1,500 miles more than that per week, it will cost less than automobile mileage to gather news by airplane."

A New York City daily scored a major newspaper victory over its competitors by rushing its photographers out to sea in one of its airplanes to cover the sinking of the Andrea Doria when it collided with the Swedish liner Stockholm.

There have been other noteworthy uses of aircraft by newspapers, including rescue operations, flights of rare serum to persons suffering from snake bite, and airlifting supplies of food and medicine to families marooned by ice and snow.

The Colorado State Game and Fish Commission uses a light plane for transporting beavers. To keep the beaver population of the state balanced, two pairs of beavers are taken from crowded areas, flown to a sparsely settled area, and dropped by parachute. The plane door is removed, and the boxed beavers are released at 200 and 300 feet in the air, depending on the terrain. The chute opens automatically by static line, and the box springs open when it hits the ground.

The record books also carry many cases of business fliers who took up aviation on doctor's orders. Usually, these were men whose jobs necessitated covering large territories. And their physicians told them that driving such long distances was too great a strain. Since purchasing aircraft, each has reported feeling more relaxed, accomplishing more work, and being able to spend more time at home.

There is apparently no limit to the potential uses of general aviation aircraft. A New Jersey auto dealer who uses a utility plane in his business was quick to take advantage of the fact that the car he was selling featured a "variable pitch" transmission. By taking prospective car buyers up in his plane and demonstrating to them exactly what "variable pitch" meant, he doubled his sales over the previous year. Incidentally, he also did a great service for general aviation, by familiarizing his auto-minded customers with the benefits of the air age.

The State of Utah discovered that by far the best method of extraditing criminals was by air. By transporting prisoners in a State-owned light plane, Utah officials learned they save on meals and hotel accommodations formerly furnished to criminals in the process of extradition. Then, too, according to a Utah State pilot, prisoners are a lot less likely to attempt escape "with all that thin air between them and the ground. They think a lot more of their skin than to try jumping out."

Besides its application as a useful tool of business, industry, and agriculture, the general aviation aircraft also serves as a fascinating means of recreation. Flying for the sheer fun of flying is a pastime that is hard to beat. Also, vacationing by plane means more time for recreation at the vacation spot chosen, and less time consumed in getting there.

Almost invariably, business aircraft owners report using their planes for family vacations and week-end hops to nearby resort areas. In many parts of the country, there are "fly-in" meetings of various aviation clubs, which afford further recreational facilities to flying businessmen.

Of the most unusual vacation jaunts on record was undertaken last summer by Peter Gluckmann in his single-engine high-wing monoplane, "City of San Francisco."

Taking off from San Francisco, he flew 25,000 miles to New York, London, Geneva, Rome, Athens, Tel Aviv, Cairo, Bengazi, Tripoli, Algiers, Dakar, Freetown, Natal, Port of Spain, Recife, Belem, Georgetown, Port-of-Spain, San Juan, Miami, and back to San Francisco.

The whole trip consumed seven weeks, and 198 flying hours. It was accomplished with the aid of complete instrumentation, a case full of maps and documents, extra fuel tanks, and one engine checkup. Gluckmann crossed the North Atlantic and South Atlantic oceans and the Mediterranean and Caribbean seas, and touched five continents—North America, Europe, Asia, Africa, and South America.

Back in 1927, when a young man named Charles A. Lindbergh made a solo flight across the Atlantic in a single-engine plane, the whole world went slightly crazy—and rightly so, since it was the first successful non-stop Transatlantic solo flight.

Gluckmann's flight, however, caused almost no stir in the newspapers, despite the fact that he, too, flew solo in a single-engine plane, and despite the fact that Gluckmann traveled a good bit farther than the famed "Lone Eagle."

If Gluckmann's flight proved anything, it proved that, at long last, general aviation has come of age, and is now safe and dependable transportation.
Meeting Stimulates New Proposal For Inter-American Cooperation

(Continued from Page 1)

airlines for long-term, large-scale purchases.

But Mr. Smith pointed out that it is against the present policy of the World Bank to make aviation loans. He also noted that U.S. insurance companies have extended long term credit to U.S. carriers which have exceeded the present net worth of the airlines. "Chattel mortgages in proper proportions should be enough on new equipment, because not only have original costs been continuous ly sustained in market prices, and will continue to do so in the foreseeable future, but the newest aircraft are demonstrably money earners and self-liquidating with adequate credit terms," Mr. Smith said.

Dollar Shortages

The arrangement of adequate credit is obviously the hinge that swings the sales of American aircraft and the equipment that goes with them. The preference for American-built aircraft is overwhelming. Only the knotty problem of dollar shortages hinders the accelerated and the hyper growth of Latin American aviation and the aircraft manufacturers' industry with our Latin American neighbors.

This is a mutual problem involving the manufacturer, the customer and government and commercial credit institutions. The aircraft manufacturer today is not able to finance the handling of new aircraft.

The aircraft manufacturer's ratio of profit to sales is well below the industry average. And the aircraft builder must re-invest a substantial portion of these marginal earnings in research and development to keep pace with his competitors in a rapidly advancing industry.

But the prospects of better credit arrangements are bright. Mr. Smith struck squarely at one point with his opinion on chattel mortgages. The considerable size of the financing involved sometimes puts the risk involved out of proportion. This is the risk in financing aircraft equipment is small when we look back over the pattern of earnings that the aircraft has made possible.

Bank Viewpoint

This is not day-eyed optimism. Alfred M. Vinton, of the First National City Bank of New York, stated: "As the earning capacity of Latin American countries increases, the overall picture should be definitely more encouraging. Certainly the United States will be increasingly dependent on the food and industrial raw materials of Latin America. To help meet this demand an ever increasing foreign investment in Latin America will be required. Capital needs will unquestionably be provided to fill the need as restrictions already eliminated, or in the process of elimination, in many countries are gradually and completely removed. As this development of Latin America's vast resources, the flow of capital from the United States to this area occurs, the problem of dollar availability may no longer as we know it today."

Mr. Vinton, of course, is taking a long-range view of the economic relations between the United States and Latin America. But the Latin American Air Association Conference has already inspired plans to hasten the development of new credit sources and to liberalize the present credit arrangements.

The conference also produced some original thinking on an organization to handle inter-American aviation problems and to pursue common goals. Without commenting directly on the specific merits of the proposal made by Lt. Col. Carlos Uribe Uribe, Colonial Air Attaché in Washington, to form an Organization of Inter-American Cooperation for Aviation, I would like to endorse the general idea of such an agency.

Equally important is the fact that the conference engendered the thought shown in Col. Uribe's plan.

There is no question that we should hold in future referred to this type. Certainly we will be able to act more decisively and be able to come up with concrete proposals aimed at solving the problems we face. We have laid the basis for a progressive program in international trade.

Tunnels Simulate Speed Spectrum

Three new blowdown wind tunnels have been installed in the high speed laboratory of the research department of a leading aircraft corporation, capable of simulating air speeds from Mach 0.5 to Mach 10.

Operating in the transonic, supersonic and hypersonic ranges, the new wind tunnels are expected to produce invaluable results in knowledge of the conditions which will be dealt with in future aircraft. Three separate tunnels were built since each speed range has its own series of problems.

Research conducted in the supersonic tunnel will be devoted initially to "thermal barrier" problems arising from the heat generated at high speeds and altitudes. The other tunnels will be used primarily on problems concerning design of inlets and exhausts of jet turbine and other advanced type engines. All three tunnels can also be used to test airplane and missile models.

The "blowdown" design of the three tunnels stores air under high pressure and discharges it in short bursts for test runs. In this manner, some 75,000 horsepower are made available to the tunnels with compact, economical equipment.

The transonic tunnel operates through the speed range from Mach 0.5 to Mach 1.5; the supersonic tunnel covers the Mach range from 1.5 to 2.5; and the hypersonic tunnel operating from Mach 5 to Mach 10 will permit conducting experiments at speeds the equivalent of between 3,000 to 7,600 miles per hour at sea level. Planning for the new tunnels has been under way for several years, and actual construction began in 1955.

Piece of String Still Plays Vital Role In Era Of Supersonic Flight

In this day of supersonic fighters, automatic flight controls, guided missiles, rockets and mighty jet engines, a little piece of string still does the same important job for today's pilots that it did for plane pilots fifty years ago.

Fifty-three years ago, Orville and Wilbur Wright tied a piece of string to their plane so that they could tell at a glance, when their plane was5 flying, whether their Flight was steady. If the string fluttered in the windstream at a 90-degree angle from the strut to which it was tied, they knew their direction was true.

By the same token, they could tell the angle of their plane in flight.

So it is today, in the era of supersonic fighters—a little piece of string still performs the same function for Air Defense fighters streaking across the skies. Air Force officers explain that the string still tells the pilot a glance at the azimuth and direction of sound of "yaw" in supersonic flight.

And, they add with a grin, when America's great aircraft industry develops the first manned space-going craft, Wright's old "yaw string" will still probably be able to tell the pilots a thing or two.

A whole new family of vacuum tubes for the electronic systems of supersonic aircraft have been developed to operate in temperatures above 932° Fahrenheit.
'Fingerprint' Test Used on Metals

The aircraft industry has borrowed from the techniques of the physician and the detective—X-rays and fingerprints—to insure the safety of metals used in aircraft and missiles.

The 'fingerprint' technique works this way: First, a small piece of the metal is mounted in plastic to form a mold about the diameter of a quarter, and an inch high. The top of the specimen is ground and polished with a paste containing diamond dust to a mirror-like finish. The surface of a metal is similar to a fingerprint in that both the surface and cross section of the metal are excellent means of identification. The metallurgist produces a "fingerprint" on the polished metal by etching it in a special bath. The bath mixture dissolves different elements in the metal at different rates which produces a shallow "fingerprint" of hills and valleys.

Special microscopes with built-in cameras are used to view and photograph the pattern. In some cases, these patterns are magnified 100,000 times. This degree of magnification would make a pin point the size of a room wall. From this and other tests the metallurgist is able to deduce the methods and procedures used in the manufacture of the metal to insure that it meets rigid specifications.

The X-ray machine is used to detect surface and base voids, cracks and other defects. This additional equipment enables the metallurgist to determine the rays reflected from the crystal faces of the metal. Different metal crystals have their reflecting faces tilted at different angles. These angles, patterns and frequencies have been catalogued for numerous metallic chemical elements, compounds and metallic phases. These two reliable techniques of metal testing means that the aircraft will have longer life, greater payload, lower operating costs and require less maintenance.

Jet 'Hot Rod' Is Used In Gear Testing (Continued from Page 1)

a load comparable to the weight of a twin-engine bomber.

The jet engines, with a combined thrust of 29,000 pounds, are started by a remote control panel. Temperatures, revolutions per minute and fuel flow are checked on the control panel, and when the readings are right, the "hot rod" is started down the track by a switch which also breaks the control lines away from the parent aircraft.

Once on its way down the 5,000-foot track, the "hot rod" is on its own, with self-contained electrical systems feeding and controlling the engines. As the car nears the end of the track, it automatically triggers a sharp cutting tire, and once the car is stopped, the front beam stops the car, and the dead load, pushed ahead on a platform, hurtles into the arresting gear being tested.

Expensive New Metals Necessary To Improve Aircraft Performance

Although titanium is the fourth most plentiful structural material on earth, it is in the critical cost class—about $20 per pound in sheet form—because of its limited use. It has been available to aircraft designers only in recent years.

Assemblies requiring the use of titanium are presently being built into two of the Air Force's supersonic fighters, and additional contracts in the near future will call for an even greater use of this metal. Aluminum whose base price is 35 cents a pound, long has been a standby in the aircraft industry. And the base price for 18-8 stainless steel sheets ranges from 73 to 87 cents a pound. Compare these figures with $30 a pound for commonly used thicknesses of titanium alloy sheet. The difference is enough to increase the price of an engine by $35,000 to $50,000 when titanium parts are substituted for steel parts.

Since the day of the atomic engine is not too far away, this type of power plant will present special problems. Among some of the materials presently considered for nuclear-powered engines are lithium, $11.50 a pound; reactor grade zirconium, $23 a pound, and beryllium, $71.50 a pound in unfinished form.

As you ponder these figures, however, and watch the modern airplanes streak across the sky, bear in mind that their efficiency as weapons has been increased even more than their speed and cost.

The value of titanium lies in its strength — comparable to that of stainless steel—yet weighing only 56 per cent as much. The metal is corrosion resistant, and it is usually a strength-to-weight ratio at temperatures in the 800-degree range makes it of prime importance to modern high speed aircraft.

Besides its high cost, titanium is also a delicate metal to work. Scratches and nicks can render a sheet of titanium worthless, since these can cause failure in forming. The costliness of titanium quickly becomes apparent from these figures:

A three-foot by ten-foot sheet of titanium, only .025 inches thick, costs $351.

A tail cone assembly for a supersonic jet fighter is only 32 inches by 92 inches including forming, but is valued at $307.

When the thickness of titanium sheet goes up one-eighth of an inch, as it does on the wind shield frame of another supersonic fighter, its cost soars to $38.60 per square foot. Because of its princely price and delicacy, titanium is handled with kid gloves by aircraft manufacturers. Some airframe makers have set up titanium conservation committees which hold special instruction classes for employees handling titanium.

Electronic Brain Is Utilized to Select Sites for Viewing Earth Satellite

A new electronic "brain" which can make 1,764,000 logical decisions a minute, as well as performing 504,000 additions, 75,000 multiplications or 33,000 divisions per minute, is now being asked to select the sites from which the earth-circling "Project Vanguard" satellite will be tracked, and to an eye to the viewing weather at each site.

The "brain" is the largest yet to be put to work on weather problems, and it is used at Asheville, N.C., at the National Weather Records Center, a joint operation of the Air Force, Navy and the U. S. Weather Bureau. It will be employed by the Air Force's Air Weather Service in climatological studies for the nation's military defense. Air Force meteorologists will be able to draw on the vast stores of data maintained in the Asheville weather records center to solve accurate military weather problems, both hypothetical and actual. When a particular military weather problem arises for a certain locale, a quick rundown on the electronic "brain" will provide a detailed analysis of it swiftly.

By providing a single continuous system for processing weather data, the machine will perform in one operation computations that previously took 42 separate steps.