Airlines Spokesman Predicts—
VAST AIR TRAVEL INCREASE THROUGH 1950'S

Industry Brains Reduce Need For Critical Materials

Aircraft engineers are engaged in a nationwide program designed to reduce—and in some cases to eliminate—a number of critical metals now needed to build jet engines.

These essential metals—most of them little known to laymen but more valuable than gold to aeronautical engineers—are alloying elements used to give strength and heat resistance to jet engine materials.

Temperatures Up to 2,200

Without them, or substitute materials which contribute equivalent or better performance and reliability properties, the blazing inferno of gases inside of America's powerful new jet engines would cause their mechanisms to melt, lose strength and deteriorate at temperatures which go as high as 2,200.

With them, engine manufacturers are able to build tremendous power into new engines. A typical new jet powerplant has the equivalent of two-and-a-half times the horsepower of the combined four engines on a World War II heavy bomber. This amazing power is produced in a package weighing, in this case, only about 3,500 pounds—less than that of one engine and propeller on the same wartime bomber.

Little-Known Materials

Among the materials that make this possible are columbium, cobalt, tungsten, molybdenum, chromium and nickel. They come from such foreign areas as the Belgian Congo, the Canadian wilderness, Turkey and the Far East. Even today, the flow of these critical alloying agents into the U.S. is a trickle; in an all-

Subcontractors Build Over Half of U.S. Plane

More than half of a typical patrol bomber produced by a major U.S. aircraft manufacturer is built by other companies.

As an example of the emphasis placed on broadening the production base, this company reports that 51% of the bomber is built by 4,000 suppliers, including 3,000 small businesses.

Subcontracting approximates 30% of this company's total output.

Spare, U.S. 'Invisible' Air Force, Insure Constant Aircraft Readiness

The aircraft industry's military production effort in the two years since Korea is not measured alone by the 10,000-plus planes delivered to the nation's air forces—but also by the equivalent of several thousand additional planes manufactured as spare parts.

Without these spare parts, combat-readiness of the nation's air forces would be reduced immeasurably in the course of normal wear and damage to operational aircraft. Damage to aircraft, of course, is sustained at an even greater rate in wartime. Just as the automobile industry has to maintain volume production of automobile spare parts, the aircraft industry must build quantities of replacement parts to keep U.S. military aircraft in flying condition.

Every month, hundreds of manufacturers feed millions of complete components and small maintenance parts into pipelines of supply that flow to U.S. air bases around the world. Spares production on this scale eliminates the need for using parts from operational aircraft in order to keep other planes flying.

A major West Coast airframe builder is currently shipping spare parts to the Far East at the rate of about a quarter-million parts per month. This company alone has produced the equivalent in spare parts of 1,000 planes since November, 1950, shortly after the Korean War started.

To provide these spare parts at the right places and at the right times, (See SPARES, page 3)

Says Present Jets Aren’t Profitable On Airline Routes

Written Especially for PLANES

By

Vice Admiral Emory S. Land
President, Air Transport Association

In 1960, United States scheduled airlines—operating on domestic and international routes—should carry more than 40 million passengers, an increase of 84% over last year. They should fly more than 25 billion passenger-miles, an increase of 92% over 1951. They should transport more than 127 million tons of mail and more than 478 million tons of cargo.

Jets in Late 1950’s

A reasonable assumption would be that even before 1960—by late 1957 or early 1958—United States scheduled air carriers will have some jet aircraft in service. While these jet transports probably will not exert a strong influence on the domestic rail-air travel market, their impact on overseas travel should reach substantial levels by the beginning of the 1960’s.

Jet transports, at this stage in their development, however, are not yet considered economical for commercial airline operations. Consequently, the airline equipment which we anticipate will carry the increasing air traffic throughout this decade will be almost wholly of the proved and economical conventional types.

Improved Economy

As jet transport design and development continue in the immediate two or three years, we expect to see improvements in fuel economy and operating dependability which will give jet-powered aircraft greater competitive capabilities. By the end of this decade, advances in jet design and experience should result in availability of jet transports that can operate, over some routes, economically on a passenger mile (or per ton mile) as present aircraft.

Since, however, the U.S. scheduled airlines are privately-owned and self-supporting, the forecasts of air traffic growth throughout the 1950’s are based on the use of the most efficient and profitable aircraft now (See AIRLINES, page 4)
Buying Planes In Europe

By DeWitt C. Ramsey (Adm., U.S.N., Ret.),
President, Aircraft Industries Association

An essential element of the free world’s mutual security effort is creation of Western European military production sources, enabling our overseas allies to provide more fully for their own military needs.

This program is being amplified by so-called off-shore procurement, financed with American funds, and is part of a broad-scale rearmament and mobilization effort aimed at deterring Soviet aggression. The threat of such proportions that half measures, easy answers and mild sacrifices are not sufficient.

The United States aircraft industry has been called upon to cooperate in this program by turning over to European allies some of its basic trade secrets, classified technical information and fundamental patents.

In addition to furnishing designs, blueprints and technical data, this nation’s plane builders have been asked for assistance and advice in training personnel. Once production gets under way, American manufacturers will face the necessity of maintaining a constant flow of change orders, test results, information on methods improvements, design changes and specification changes to foreign producers. Moreover, the U.S. aircraft industry must—if the program is to be carried to a successful conclusion—cooperate in the solution of the peculiar production problems of foreign manufacturers.

Quite obviously, there will be a severe tax on the facilities and the time of domestic aircraft producers—a far greater tax, for example, than would be required even in the case of technical assistance to a domestic licensee accustomed to American production procedures and standards.

Granted the necessity for off-shore procurement (and the United States aircraft industry endorses the program’s principle in these uncertain times), it would seem logical that the problem be approached through channels which offer the greatest savings to the American public and the maximum protection to companies whose proprietary rights are involved.

In many instances, U.S. manufacturers already have agreements with foreign manufacturing sources, as well as service centers and trained technicians in foreign countries. It would therefore seem both economical and equitable to use, whenever possible, these established and experienced sources for off-shore procurement and for local supply of American-built equipment.

At the same time it would appear most logical to utilize existing commercial agreements between U.S. companies and foreign nations as the primary media for achieving the objective, and to avoid whenever possible the creation of duplicating commercial or foreign government-owned facilities.

As European production sources are created, design and development work must progress in America in order to assure continued superiority of our military weapons. Extreme importance should be attached in this industry’s view, to the health of the competitive economic system which in the past has supplied superior American military aircraft to the free world. Under the off-shore procurement program, adequate compensation should be given for creative design engineering and production planning by American companies, as well as for actual production operations abroad.

The foregoing clearly leads to the conclusion that the American manufacturers concerned should participate in negotiations prior to the granting of private production rights to specific foreign producers. Certainly the greatest frugality with tax dollars and the least disruption of normal international trade can be achieved through discerning use of presently established commercial channels and through recognition of the private licensing agreements in existence.
Over 10,000 Four-Place Utility Planes
Built by Aircraft Industry Since '48

U. S. lightplane manufacturers
have built more than 10,000 single-engine,
four-place aircraft since 1948—a tremendous fleet of light
aircraft capable of six-million-passenger
miles of transportation per hour!

These planes, combined with the
nation's private multi-engine fleet
(larger than the airlines fleet) and
the thousands of two-place light-
planes built since the end of World
War II, provide the United States
with a vital defense transportation
fleet in event of war.

Defense Reserve

This civil non-airline fleet represen-
ta tremendous reserve transportation
potential. In case of atomic
war, it is possible to furnish the
United States with a vital defense transportation
fleet having a sales value of $22 million.

A government agency which approves
civil aircraft programs for which
controlled materials are allocated,
has authorized production of 4,637
utility-type aircraft in 1953.

Production on Up Curve

For over a year following the out-
break of war in Korea, materials
were not available for non-airline
type civil aircraft—and production,
as a result, dropped to a postwar
low of 2,302 units in 1953. The
present defense materials priority allo-
cations system, however, has pro-
vided for a minimum of 3,500 utility
aircraft annually—and production is
again on the upward curve.

Spares Keep Planes
In Combat Readiness

(Continued from page 1)

thus achieving the most economical use of the air power by
vent the necessity of "cannibalizing"
complete aircraft, an estimated
25% of total U. S. civil aircraft produc-
tion today goes into output of
spares.

Engine Spares

The percentage of spares for en-
gines and other installed plane
equipment is considerably higher.
For example, at least one extra jet
engine must be built for every one
installed in a plane. The spare keeps
the jet plane in combat readiness at
the same time its initial engine is fed
back to repair stations for major
overhaul.

This essential element in building
and maintaining air power adds con-
siderably to the cost of planes—but
is considered the most economical way of keeping the maximum
number of military aircraft in fighting
condition over a long period of time.

During recent Senate hearings on the
Air Force Department budget alo-
ations, the Air Force estimated
that for every dollar spent to buy
aircraft, 60 cents was used to pur-

Korean War Crisis

In 1950, the industry's task of
supplying the military with plane
spares became herculean almost
overnight. Most of the planes first
sent into action in Korea were
World War II types, no longer in
production. To build spares for
these planes meant that old tooling
had to be set up again—and space
allocated in plants already strained
by the demands for production of
new aircraft.

In 5 days, orders for spares for
these World War II planes at one
West Coast plant jumped from $500
thousand to $25 million! The crisis in
the battle of planes for Korea has largely passed, even
though the fight continues. How-
ever, the industry is continuing its
herculean task to prolong the service
life of planes and engines, thus
reducing the number of spares re-
quired.
Engineers Studying Properties of Glass For Aircraft Skins

With many components in late-model jets already fabricated from glass fiber laminate, a supersonic airplane having all-glass skin is under serious study by aircraft engineers. Searing temperatures caused by friction of air passing over a plane at ultrahigh speeds break down mechanical properties of present metals. Aircraft engineers are investigating the ability of glass to withstand such extreme heat. A leading engineer, head of materials and process engineering for a West Coast aircraft company, envisions a future plane with glass wings, ailerons, stabilizers and fuselage, put together with glass rivets and supported by lightweight titanium and stainless steel structures. This future model, he says, would be powered by an engine capable of propelling the plane at more than 2,000 m.p.h.

ARDC Booklet

The Air Research and Development Command recently published a booklet describing ARDC's organization, functions and proper lines of contact between the various divisions and laboratories. Copies may be obtained by writing the Director of Procurement, Contractors' Relations Office, Headquarters, ARDC, Baltimore 3, Md.

PLANE FACTS

- To build a jet engine in 1947 required 5,250 tools; to build the much more powerful jet engines of today requires 20,000 tools!
- In a modern jet bomber's wing alone, there are near 6,000 bolt holes which must be accurate within one to two thousandths of an inch—or less than the thickness of a human hair.
- A typical engine manufacturer's base labor rate increased 250 per cent from 1941 to 1951.
- The wings of a late-model plane must have 35 hatch covers through which mechanics and inspectors can check the intricate machinery housed inside.
- The tremendous advances being made in jet engine performance and frequency of design changes by the military resulted in 2,100 engineering changes between the first and nineteenth new jet engines produced by a major U.S. manufacturer.
- Aerodynamic forces exerted on a supersonic fighter are so great that the plane's power control system must be capable of exerting 100 times more pressure on the control stick than can an average pilot.

Airlines Spokesman Forecasts Vast Air Traffic Increase In Next Eight Years

(In the international and overseas fields, U.S. flag scheduled air carriers should, by 1960, greatly benefit from the advent of the jet, which probably will take an increasing portion of the steamship market, especially for transatlantic traffic. At the present time, the airlines are carrying approximately 35 per cent of transatlantic traffic. This could rise to 70 per cent by 1960. In that year, the U.S. international and overseas scheduled airlines

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<th>Domestic Carriers:</th>
<th>Revenue Passengers</th>
<th>Passenger Miles</th>
<th>Mail Ton Miles</th>
<th>Cargo Ton Miles</th>
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<tr>
<td>1952</td>
<td>26,190,000</td>
<td>12,257,000,000</td>
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<tr>
<td>1955</td>
<td>32,630,000</td>
<td>15,500,000,000</td>
<td>84,278,000</td>
<td>291,000,000</td>
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<tr>
<td>1960</td>
<td>41,250,000</td>
<td>19,800,000,000</td>
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<table>
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<tr>
<th>International Carriers:</th>
<th>Revenue Passengers</th>
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<th>Mail Ton Miles</th>
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<td>1955</td>
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<td>89,908,000</td>
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<tr>
<td>1960</td>
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<td>5,510,000,000</td>
<td>28,119,000</td>
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HORSEPOWER BARGAIN

PRICE PER HORSEPOWER

<table>
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<th>Engine Type</th>
<th>Price</th>
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<tr>
<td>Diesel</td>
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</tr>
<tr>
<td>Electric</td>
<td>$50</td>
</tr>
<tr>
<td>Outboard</td>
<td>$35</td>
</tr>
</tbody>
</table>

AIRCRAFT ENGINE $17

Aircraft horsepower costs less.

"PLANES" SOURCE: Typical Aircraft Engine Manufacturers

Robot Engineer Cuts Flight Testing Time

An electronic "engineer"—occupying only two cubic feet of space in modern experimental aircraft—is cutting months off the time previously required for testing today's high-speed planes. During flight tests, the device cascades information from airborne craft at the rate of some 3,000 items of intelligence per second, taking readings from 176 separate points within the plane.

This radioed information goes to engineers at a ground console, where readings are analyzed automatically and additional performance tests directed on the basis of observations made while the plane is in flight.

Answers to Planes Quiz

1. (b)
2. (c)
3. (d)
4. (c)
5. All of them, including the Army, Navy, Marines and Air Force (also Coast Guard).
6. True, The bombing system contains 299 miles of wiring while the average distance from New York to Washington, D. C. is approximately 215 miles.
7. True.
8. (b)
10. (a) Flight rebuilding was demonstrated by Lt. Geoffrey L. Cabot, USNR, October 3, 1918.