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Airplanes • Missiles • Helicopters • Aircraft Engines • Spacecraft

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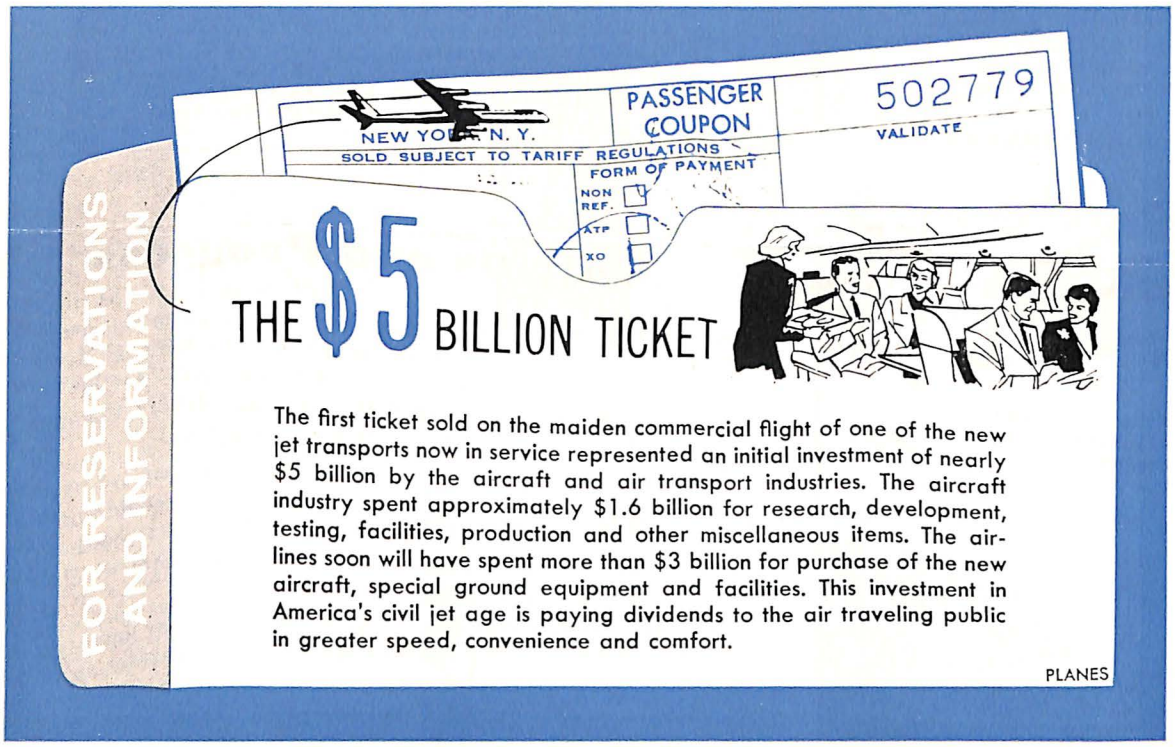
ARMY AVIATION UNITS DUE FOR EXPANSION



5,000 Planes Now In Operation

By Brig. Gen. E. F. Easterbrook
Director of Army Aviation

In this era of fantastic progress, we hear almost daily of some new development in earth satellites, lunar probes, projected space vehicles, commercial jet transports whose speeds approach that of sound and new military planes which can move twice as fast as sound.

Such developments are vitally important to the future of our nation and of the world. They tend, however, to overshadow another story of aviation progress, one which is not quite as spectacular but which is nonetheless very important to our system of defense.

I refer to the continual growth of Army Aviation, which has contributed in great measure to the modernization of our land forces. We are constantly finding new methods of employment of the "low and slow" aircraft and helicopters which are the vehicles of Army Aviation, methods which add considerably to the mobility and flexibility so necessary in modern land warfare.

Army Aviation has been growing steadily. Today, the Army operates more than 5,000 aircraft. There are upwards of 5,000 officer aviators, and, in addition, 1,200 warrant officer aviators and some 10,000 trained enlisted personnel who are aviation specialists. There are more than 40 aviation units in the active Army today, and there are plans to increase this number within the coming years. Aviation continues to receive priority consideration in the Army budget.

Despite the emphasis currently being placed on air operations, Army Aviation is *not* a cohesive branch of the service like the Infantry or the Artillery. It is instead an activity, the planes and their operators being assigned to support the operations of those branches.

Generally, there are two areas in which the air vehicle is highly effective in modern warfare. First, it greatly increases the ability of the

(See ARMY Page 3)

ICC Approves Railroad Rate Increase on Aircraft Parts Double That Charged Other Equipment

By HARRY R. BRASHEAR
Director, Traffic Service
Aircraft Industries Association

The aircraft and missile industry, with tens of thousands of subcontractors and suppliers located in every state of the Union, is dependent on an efficient, economical transportation system to bring together the thousands of parts and assemblies for modern weapon systems.

Traffic managers for aircraft and missile firms have shown imagination and skill in handling shipments, but there is a limit to the economies they can effect, the money they can save in the national defense program.

These limits are imposed by the rates approved by the Interstate Commerce Commission for the items shipped. The give-and-take of competition has taken a curious turn regarding the rates on aircraft parts.

For example, the ICC last year in a decision awarding railroad rate increases stated:

"We have heretofore suggested that the time had probably come when consideration should be given to ways of increasing rates other than by means of horizontal increases. (A blanket percentage increase.)

The carriers should give consideration to this suggestion. If tariffs are filed as outlined herein, they should reflect the results of this consideration."

The railroads interpreted this to mean that shippers who could divert traffic to some other form of transportation would obtain lower rates than those who could not divert their traffic.

The carriers proposed an increase of 5 per cent on aircraft parts and aircraft engines while no increase was proposed on machinery of other kinds.

The Aircraft Industries Association strongly protested this increase, producing data showing that the rates on aircraft parts today are contributing more per ton to railroad dividends than any other commodity. The railroads in defending their proposal said that if competition — or diversion of traffic — increased, they would reduce rates accordingly. The ICC went along with the railroad reasoning, granted a 5 per cent increase on aircraft parts

(See RATE, Page 3)

New Metal Cutting System Reduces Scrap, Lowers Costs

Substantial savings are being made by an aircraft and missile company in reducing the amount of metal scraps. Method: "Operation First Cut."

The material department plans "first cuts" of sheet metal stock, extrusions, bar, rods and tubes, and makes certain that the division takes advantage of remnants whenever possible.

A new remnant stores crib built adjacent to the first cut area provides protection for more than 50,000 pounds of remnants valued at more than $100,000. The bins are well identified and are able to fill over 40 per cent of all requisitions calling for like material to produce minimum remnants and scraps.

As a result of the plantwide effort, there also has been a reduction of 4,000 pounds a month since last May in the amount of hardware —nuts, bolts and the like—picked up off the floors and carted off to salvage.

Four other programs have resulted in an estimated $85,000 in savings. These are the use of obsolete honeycomb core, reclamation of casters, salvage of obsolete tube fittings and use of rejected fiber glass.

Plane Views

PLANES

Planes is an official publication of the Aircraft Industries Association of America, Inc., the national trade association of the designers, developers and manufacturers of aircraft, missiles, spacecraft, their propulsion, navigation and guidance systems and other aeronautical systems and their components.

The purpose of *Planes* is to:

Foster public understanding of the role of the aviation industry in insuring our national security through development and production of advanced weapon systems for our military services and allies;

Foster public understanding of commercial and general aviation as prime factors in domestic and international travel and trade.

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Patents and Progress

Congress responded promptly during its last session to the need for an agency to direct our space exploration efforts. The National Aeronautics and Space Administration was established by the Space Act of 1958 and already this agency, formed around the National Advisory Committee for Aeronautics, is deeply engaged in several space projects.

In any legislation covering such a broad and comprehensive program of aeronautics and space, there are inevitably provisions that could work against efficiency and economy. The section dealing with patent rights has serious flaws which will have the effect of stifling inventive efforts which are the heart of our national space program.

The patent section of the Act states, in effect, that any invention—with minor exceptions—made in the performance of any work under any contract with NASA is the exclusive property of the Government. This means that any contractor or subcontractor, no matter how far removed he may be from the prime contract, could lose his inventions even though he is unaware that his work has any relationship to the NASA.

In addition, no matter whether he is an NASA contractor or not, any person making an invention which appears to have significant utility in the conduct of aeronautical and space activities must declare under oath that his work was not related to any contract with NASA before he can obtain a patent on his own invention.

The restrictive language is emphasized when it is compared to the rules governing inventions made under Department of Defense contracts. Briefly, these regulations permit the company to retain title to the invention, with the Government holding license rights. Further underscoring the comparison is the fact that the aircraft and missile industry is the industry which is responsible for the bulk of hardware used in the space program. The materiel required in space activities is based on the developments made for aircraft and missiles. And the same companies are doing work for both the Defense Department and the NASA.

This paradox of regulation can only serve to confuse and hamper contractors in their dealings with the Government.

Hearings on this aspect of the Space Act were not held by either the House or Senate Committees responsible for the legislation. In fact, there were no provisions governing patents in the Administration bills introduced in Congress. This section is the product of a conference between the House and Senate members, based on discrepancies between the bills they had respectively passed. They vary widely from the recommendations of business firms and bar associations made to the House and Senate conferees during the few days available for their presentations, and probably adopted on the theory that they could be changed in the next session of Congress if serious objections arose.

The objections are serious. The aircraft, missile and spacecraft industry is able to attract competent, imaginative scientists and engineers with the pledge that their endeavors—such as new inventions—will be rewarded. Remove such incentives and the keen edge of inspiration is bound to be dulled—involuntarily, to be sure, but it will be dulled nevertheless.

The next session of Congress will be well advised to hold hearings to discover how the present legislation can work against an efficient, economical space exploration program.

Wiring Assembly Saves Time, Money

A lightweight wiring assembly apparatus—a "harness carrier"—developed by an aircraft company permits transfer of wires from harness board to aircraft with a minimum of chafing and bending, and saves manpower to boot.

The supersonic jet fighter manufactured by the company has a one-piece main harness which has more than 400 wires and is 40 feet long.

The harness carrier is made from two and a half inch aluminum tubing and weighs only 75 pounds despite its 32-foot length. Once the harness is completed on the board, the carrier is lowered over it by electric crane and the wires transferred to its contoured shape and fastened by rubber straps.

The carrier is then lifted off the board and rolled on its small wheels to the aircraft assembly line. There it is lifted alongside the fuselage of the plane and rotated 90 degrees.

The carrier holds the harness in the exact shape in which it comes off the board.

Sixteen men were required to transfer the harness from the old transport cart to the plane but, with the new carrier, two men can do the job.

AIR QUOTE

"The astuteness, integrity and managerial skills of industry leaders will determine how soon new systems are brought into the operational inventory. They will also have a direct bearing on the size of the defense bill the taxpayers will have to pay. Since over 50 per cent of the Air Force appropriation goes toward these purchases, this effect on total cost will be significant.

"Designers, engineers, and production people, on the other hand, virtually have it in their hands to set the pace of our technological progress. *They* are the ones who must think their way through knowledge barriers. They are the ones who must transform theory into design, and design into highly efficient machinery. In the final analysis, they are the ones who will determine our success in maintaining the degree of superiority which our aerospace weapons and weapon systems currently possess.

"With ingenuity and vigorous productivity from industry . . . I am confident that we can fulfill this aim." — *Hon. David S. Smith, Ass't. Secretary of the Air Force, Sept. 23, 1958.*

Army Developing New Plane Uses

(*Continued from Page 1*)

Army commander in a combat zone to acquire information so that he may make the most efficient use of the forces under his control. This mission requires day, night and all-weather surveillance of the battle area to locate and verify targets against which the commander's artillery or tactical missiles may be employed. To this mission the airplane has added two very important elements: greater range of observation and more rapid transmission of the information obtained.

The second major mission is rapid movement of troops, weapons and supplies from one area to another within the battle zone. The mobility thus acquired is of the utmost importance. Our peacetime Army cannot match manpower with the forces available to our potential enemy. Thus, the ability to concentrate manpower and firepower where needed the most can offset a disadvantage in numbers. Mobility might be defined as "beating the other guy to the punch by moving faster and more purposefully than he does."

Army Aviation is a particularly important factor in view of the Army's requirement to be ready for either a nuclear or a non-atomic war. Since the tempo of a nuclear war is much faster, speed of reconnaissance and transportation and the attendant capability of wide dispersion of forces is enhanced by the airplane.

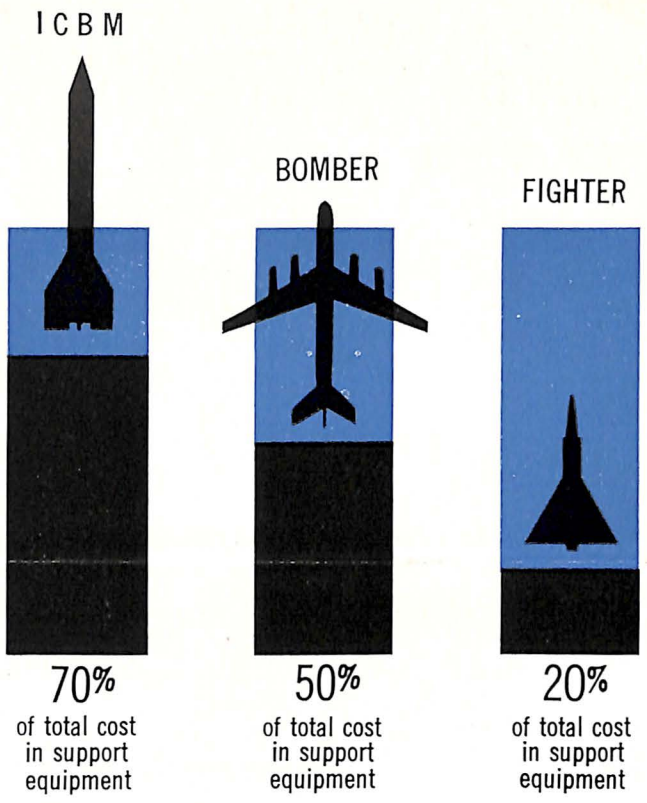
As for the organization of Army Aviation, we have today two types of units. First, there is the combat aviation company, consisting of about 70 officers, 150-200 enlisted men and about 50 aircraft of several varieties. This company is organic to the combat division; one company is assigned to each infantry, armored and airborne division and may be used by the commander for a number of purposes ranging from liaison to reconnaissance.

The other type of unit is the transportation company, which may be equipped with either airplanes or helicopters. Generally, these companies are single-type aircraft companies. They usually have about 20 aircraft, and are broken down into light transport helicopter, medium transport helicopter and transport airplane units. They are staffed by 40 to 50 officer and warrant officer aviators and 100-150 enlisted aviation specialists. Their mission can be likened to that of the truck, except that they are not hampered by mud-bogged roads or blown-up bridges, and their speed is considerably more impressive.

In perfecting the techniques of the employment of aviation in Army operations, we are not without our problems. For one thing, our officer aviators must remain qualified in a basic branch of the service in addition to their piloting activities.

We also must operate our aircraft in the field side-by-side with the troops they support and under these adverse conditions maintenance of the aircraft becomes more difficult.

SUPPORT BUDGET INCREASES SHARPLY



The Air Force budget for aircraft and missile support equipment has increased one and a half times during the Fiscal Year 1956 and Fiscal Year 1959 period. In FY 1956, the amount was about $1 billion, and the FY 1959 budget is $2.5 billion. The increase is due to the complex equipment required in missile operations and the command and warning systems for air defense. The cost of ground support equipment, with respect to the over-all cost of a weapon system, is approximately 70 per cent for an intercontinental ballistic missile, 50 per cent for a heavy bomber and 20 per cent for modern fighters. This includes direct support only and does not cover such items as runways, buildings and indirect type support equipment.

'PLANES'

In addition, in modern warfare with its greatly improved weapons systems, there is an increased requirement for troops to take advantage of the cover afforded by weather—darkness, rain or fog. Since our planes must be ready when the soldier is ready, there is an obvious requirement for maximum all-weather capability.

Finally, we are continually working toward minimum altitude operation, in order to use terrain features as blocks to enemy radar scanning. This imposes additional problems of aircraft control, navigation, and fatigue.

We are working hard on all these problems and, in addition, we are constantly looking for new techniques and new equipment which will increase our aviation capability.

In the area of techniques, for instance, a relatively new idea is arming our reconnaissance helicopters with machine guns and rockets. This is by no means an infringement on the Air Force's tactical mission. It is, rather, an extension of ground reconnaissance methods. The firepower available to the helicopters permits them to pin down enemy ground fire, providing a degree of protection which increases their chances of performing their basic mission.

We have also worked out techniques for hauling and relocating certain of our tactical missiles which can be helicopter-lifted, increasing the efficiency of missile operations.

As for equipment, there are a number of new developments forthcoming.

Among the more interesting is the "flying jeep." Currently, three manufacturers are working on this device and one of the machines is in flight test status. The aerial jeep will have as many and as varied uses as its ground counterpart.

For our reconnaissance mission, a new and greatly improved plane is scheduled to fly next year. Equipped with several information-gathering devices such as cameras and infrared detection systems, the plane will have such "extras" as armor and low-altitude ejection seats for the crew of two.

Also under development are various types of convertiplanes (which rise and land like helicopters, but fly as airplanes), which could afford a greater degree of flexibility by combining several types of missions in a single airplane.

There are a number of other techniques and equipments under development or under consideration. We in Army Aviation have not yet found the perfect system or the perfect air vehicle, but we will continue to look for both.

Rate Boost Based on 'Competition'

(*Continued from Page 1*)

although the average increase granted was only 2.3 per cent.

Routing control of this traffic is largely in the hands of the Military Traffic Management Agency, and the aircraft and missile industry is largely without power through routing to exercise restraint upon the carriers in imposing rate increases. The manufacturer has the authority to route shipments of only 1,000 pounds or less owned by the government. Air Materiel Command controls shipments between 1,000 and 10,000 pounds and the MTMA handles all others.

The aircraft manufacturers can demonstrate that substantial sums could be saved by letting them handle movement of all government-owned materiel, including shipment of the end article to its first destination. This would permit the development of more competition, which the railroads and the ICC obviously believe to be the ruling factor in their scheme of rate-making. In addition, it would be a logical part of the weapon system contract under which the prime contractor is handed full responsibility for the development of a weapon from idea to hardware.

In one single case, the AIA's Traffic Service was able to secure reduced rates on the movement of electronic equipment used in missiles which assure the manufacturers involved a savings of $100,000 a year.

Similar savings would be possible in aircraft and parts if the manufacturers can engender lower rates by giving them a free hand in all shipments.

Space Pilots To Receive Lengthy Preparation

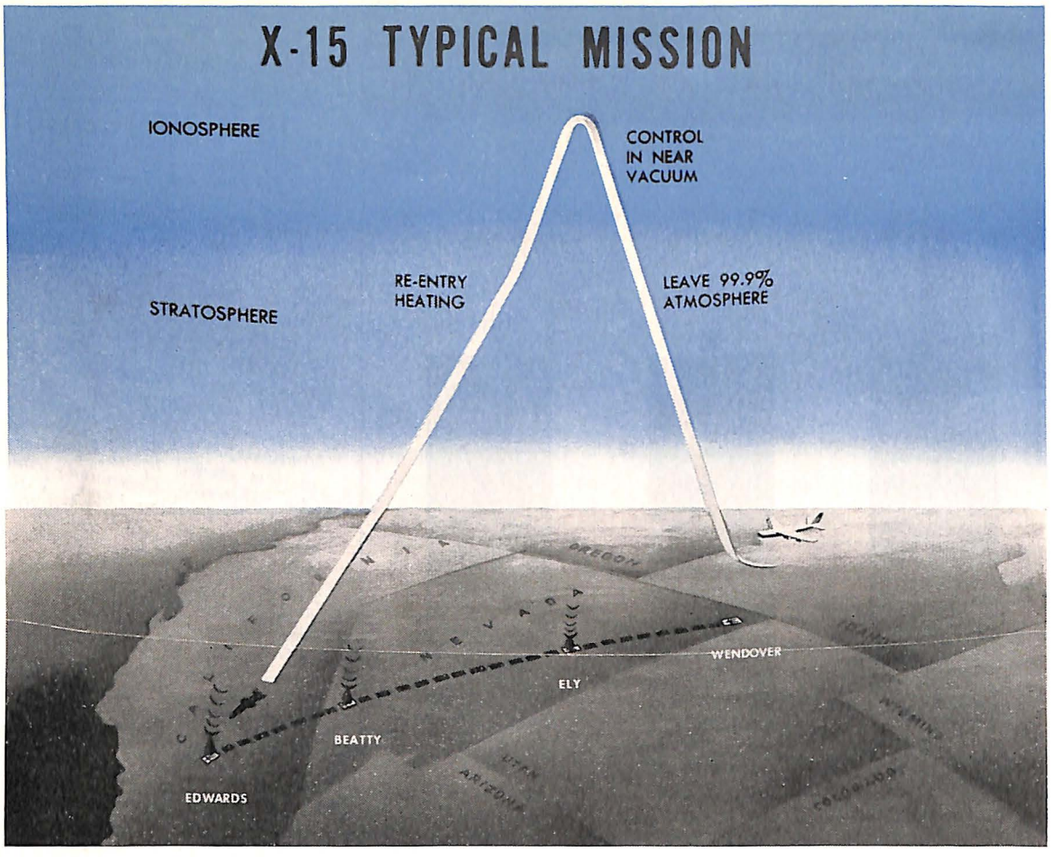
Experience — not youth — will be the factor in choosing space pilots to man the Dyna-Soar — the most advanced weapon system under development today.

Dyna-Soar, a manned boost-glide vehicle with orbital flight potential, is being developed by two teams of airframe, propulsion and guidance companies.

Behind the pilots making the first flight will be hundreds of hours of preparation. They will fly in the fastest Air Force planes. They'll be whirled in huge centrifuges, make simulated space flights with many expected conditions duplicated.

Their job initially will be to help develop the best cockpit and control system arrangements, to add the pilots viewpoint to the solution of space-flight problems.

Height and weight of pilot will also count. Specifications: height—5 feet 10-10½ inches; weight—150-155 lbs.



Space Research Plane Represents Manufacturing Team Effort of 300 Large, Small Firms

Construction of the X-15, a rocket-powered manned research vehicle which will explore the problems of hypersonic space flight and re-entry into the atmosphere, represents the combined team effort of more than 300 firms, large and small, located in every section of the country.

The prime contract was held by an airframe manufacturer who directed the industrial team effort along with the government agencies involved in the X-15 project—the U. S. Air Force, National Aeronautics and Space Administration and the U. S. Navy.

One of the major manufacturing problems was the use of materials which could withstand the extremely high and extremely low temperatures occurring almost simultaneously. These temperatures ranged from 1,200 degrees Fahrenheit to minus 300 degrees Fahrenheit. A special steel alloy, which met the design and specification requirements, was selected but no detailed experience of welding aircraft structures with it was available. Specialized welding and handling equipment had to be developed.

Techniques for contouring skins were developed involving the use of hot machining, cold machining, ovens, freezers, slicers and rollers.

Despite the fact that the X-15 will wear an external skin of the special steel alloy, other metals were used. Titanium and stainless steel are used in the primary structure to handle the heat that may come through the steel alloy skin. Aluminum is used internally where high heat and high loads are not a problem. Approximately 65 per cent of the X-15 is welded structure and 35 per cent is fastened, compared to 100 per cent fastened for current operational aircraft.

Another problem unique to the X-15's mission was the control of the aircraft at extreme altitudes where normal controls will not work because of lack of air. The X-15's controllability will be dependent upon ballistic control rockets in the nose and wingtips. These work by moving the spacecraft opposite to the force of the jet streams of gas.

The research vehicle will carry more than 1,300 pounds of instrumentation involving about 600 temperature pickups and 140 pressure pickups.

The recent roll-out of the X-15 is a tribute to the team efforts of the aircraft and missile industry and its associated contractors.

Automatic Riveters Produce Huge Savings

Huge sums of taxpayer dollars are being saved in an aircraft plant with the installation of automatic riveting machines. The automatics can operate three to five times faster than the old hand operated variety, eliminate the noise of regular riveting guns, and have saved the plant $1½ million since the first ones were installed in 1953.

The big machines obey a reel of punched tape, jump over obstructions, move from one row of rivet-pattern to the next, and stop by themselves. When engineering changes require revision of the riveting pattern in an aircraft panel, the tape can be cut and a new punched pattern inserted, as in movie film.

New 'Ships and Aircraft' Published on Fiftieth Naval Air Anniversary

The Ships and Aircraft of the United States Fleet, by James C. Fahey, Associate, U. S. Naval Institute. Published by Ships and Aircraft, Box 548, Falls Church, Va. Seventh edition, 64 pages, profusely illustrated, price $2.50.

The U. S. Navy did not get its first airplane until 1912, but the concept of sea-borne aviation was inaugurated in 1908 with an investigation into the potential of Professor Langley's aircraft. So, in a sense, the year 1958 marks the 50th anniversary of naval air power.

Coincidental with this anniversary, James C. Fahey has published the seventh edition of his excellent "Ships and Aircraft." In great detail, Fahey's book includes every ship available to the Navy, active and inactive, with photos and vital statistics. Also included are details of several generations of Naval aircraft, guided missiles, target drones and test vehicles. Of particular note is the information on the Navy series of fleet ballistic missile launching submarines. An extremely accurate presentation, "Ships and Aircraft" is an invaluable reference work for the student of Navy surface, sub-surface and aviation operations.

Missiles Now Have 'Exercise' Machine

A new type of missile handling vehicle which doubles as an "exercise" machine is giving one of this nation's air defense missiles a "western style" workout on the ground to insure reliability in the air.

At one aircraft plant 12 of the machines will be used in place of much more expensive missile davit positions at a cost saving of $386,000.

Produced by an aircraft and missile manufacturer, the missile "dolly" is more than just a set of wheels to make a missile movable on the ground; it also automatically puts the weapons through a sequence of simulated flight attitudes to check out its guidance system.

The machine bumps, bucks, sways and rolls the missile through a 2½-minute sequence of the kind of jolts it might expect in flight. In this way the guidance system's ability to correct for these buffeting motions can be assured.

The man-made bucking bronco represents a combined assembly vehicle, a "soft-mount" dolly and a missile exerciser. It will greatly reduce the number of times a missile must be lifted from one kind of supporting structure to another. The missile can ride this one dolly from assembly, through inspection and testing.

"Soft-mount" refers to the four air springs on which the missile is carried. The air spring uses the natural bounciness of trapped air as its spring energy. Any one of the four mounting springs can be fully extended or compressed simply by pumping in or bleeding off air.

The missile mounted on the dolly can be bounced easily by one man using one hand, a feat that formerly took three to four men using all the leverage they could muster.

Gas Gun Produces 13,500 mph Speeds

A gas-driven hypersonic gun capable of producing speeds of up to 13,500 miles an hour will be built by a U. S. aircraft company for advanced research on ballistic and other high-performance missiles and atmospheric re-entry problems of manned space vehicles.

The hypersonic gun may be used in two ways: One will be to drive projectiles through a 100-foot, three-inch gun barrel and into test chambers at velocities of up to 20,000 feet per second. The other method will be to shoot high-pressure, high-velocity gas past a stationary model suspended in a test chamber.

Both projectile and stationary model testing will provide technical data useful in the design of missiles and winged space craft to insure protection of the contents of the vehicle, whether these be a thermonuclear warhead in a ballistic missile or the crew of a space craft entering the atmosphere of the earth or another planet.