U. S. Navy F3H-1
Demon

McDONNELL Airscoop

U. S. Air Force F-101A
Voodoo

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F-101 VOODOO UNVEILED!

DURING A SHORT INTERLUDE while press photographers were preparing to take pictures, E. M. "Bud" Flesh, F-101 Project Engineer, left, and *Robert C. "Bob" Little, Chief Test Pilot,* right, gave Mr. Mac a briefing on engineering data resulting from previous F-101 test flights which took place at Edwards Air Force Base. The occasion was the first public appearance last month of the F-101 Voodoo, supersonic long-range fighter built for the Air Force. The airplane flew for the first time from the St. Louis-Lambert Airport later in the week.

Powerful, New Strategic Fighter Built for USAF

F-101 Was First Shown, Later Flown at St. Louis-Lambert Airport Last Month

The F-101 Voodoo, a supersonic long-range strategic fighter built for the U. S. Air Force by M.A.C. and believed to be the world's most powerful fighter airplane, has been unveiled for the public. It was rolled out on the ramp for its first initial public appearance on November 22, and representatives of the local press were invited to see it.

Full Designation

The model's full Air Force designation is the F-101A. Previously produced F-101A's are being flight tested at Edwards Air Force Base, Muroc, California, where the first flight was made this fall.

Designed to meet Air Force requirements for a long-range fighter, the F-101A will be assigned to the Strategic Air Command. It is in the supersonic class, capable of inflight refueling and carrying atomic weapons.

Aircraft dimensions of the F-101A are 39.7 foot wing span, 67.4 foot length and 18 foot height. Both wings and stabilizer are swept back 35 degrees. The wing skin consists of heavy, tapered, pre-formed sections. The Voodoo employs a tricycle landing gear and retractable speed brakes housed in the aft fuselage section.

The airplane is equipped with a parabrake—a *parachute stored in* the tail section compartment which may be released by the pilot to reduce the landing roll.

Power for Jet

Two Pratt and Whitney J-57 turbojet engines which power the Voodoo develop a total of approximately 20,000 pounds of thrust.

Most of the unusually large fuel load carried by the F101A is contained in the fuselage with additional provisions made for carrying extra fuel externally.

A staff of 45 M.A.C. engineers and technicians is now stationed at Edwards Air Force Base, California, and will remain there for approximately one year for the purpose of conducting an intensive flight test program on the Voodoo.

M.A.C. received a contract for production engineering and tooling of the F-101A Voodoo in January, 1952. In September of that year an order was received for production quantities of the fighter. M.A.C. also has a contract for the development of a photo-reconnaissance version of the airplane.

Earlier Voodoo

The F-101A is the aerodynamic evolution of an earlier Voodoo model, the XF-88A, which made its first flight in October 1948. The first fighter of its type to complete evaluation tests by Air Force pilots, it was found to be extremely fast, maneuverable and versatile.

The F-101A Voodoo represents the first major Air Force production contract awarded M.A.C. by the U. S. Air Force. To handle this volume of business, our company recently completed a $20 million facilities expansion program which provides the company with a completely integrated defense plant at Lambert-St. Louis Municipal Airport.

More Voodoos to Be Made for AF

The announcement that M.A.C. has received an Air Force contract for over $100 million for production of additional F-101 Voodoos was officially released to the press simultaneously with the official announcement of the new airplane.

The order was in the form of a "follow on" contract to supplement production orders now being executed.

"Just Right" Sums Up New USAF Jet

Teammates are proud of their new F-101 Voodoo not only because so many have worked long and hard on the project but because they are so pleased with the result of that effort.

Kendall Perkins, Vice-president-Engineering, expressed the sentiment of all of us when he recently wrote the following statement for an Air Force publication: "Once in a long time a new airplane is flown which seems to be 'just right.' Such an airplane performs the right missions with the right weight and performance with a minimum of trouble at just the right time. Luck has something to do with it but far more it represents the end product of a lot of good decisions made along the way by a lot of people working together harmoniously.

"During the last quarter century, I have worked with many designs but none, it seems to me, have been so 'just right' as the Voodoo."

Voodoo's Origin Started with XF-88

The successful first flight of the F-101 is, in reality, a climax to some eight years of hard work, perseverance, good judgment on the part of those with responsibility for decisions . . . and dedication.

In the sense that everyone did his job well, the first flight is not a finale but an anti-climax. The F-101 Voodoo, a long-range strategic fighter built for the Air Force, has behaved in flight pretty much as pre-flight predictions had indicated.

The story of the development of the F-101 begins not with a contract for the powerful, long range fighter we have today but with the contract received in June of 1946 for a "penetration fighter," later designated the XF-88 Voodoo.

From the beginning, the engineering work done toward the development of the Voodoo was dedicated effort *directed toward a goal* in which the participants had self confidence.

The dedicated effort perhaps indicates why a relatively high percentage of engineers who worked on the XF-88 were chosen to follow through on the development of the F-101. And the high level of experience acquired by the "veterans" explains why the F-101 is being regarded as greatly advanced for its time.

If credit can be given for what is so much a team effort, the largest portion would go to E. M. "Bud" Flesh, not only project en-

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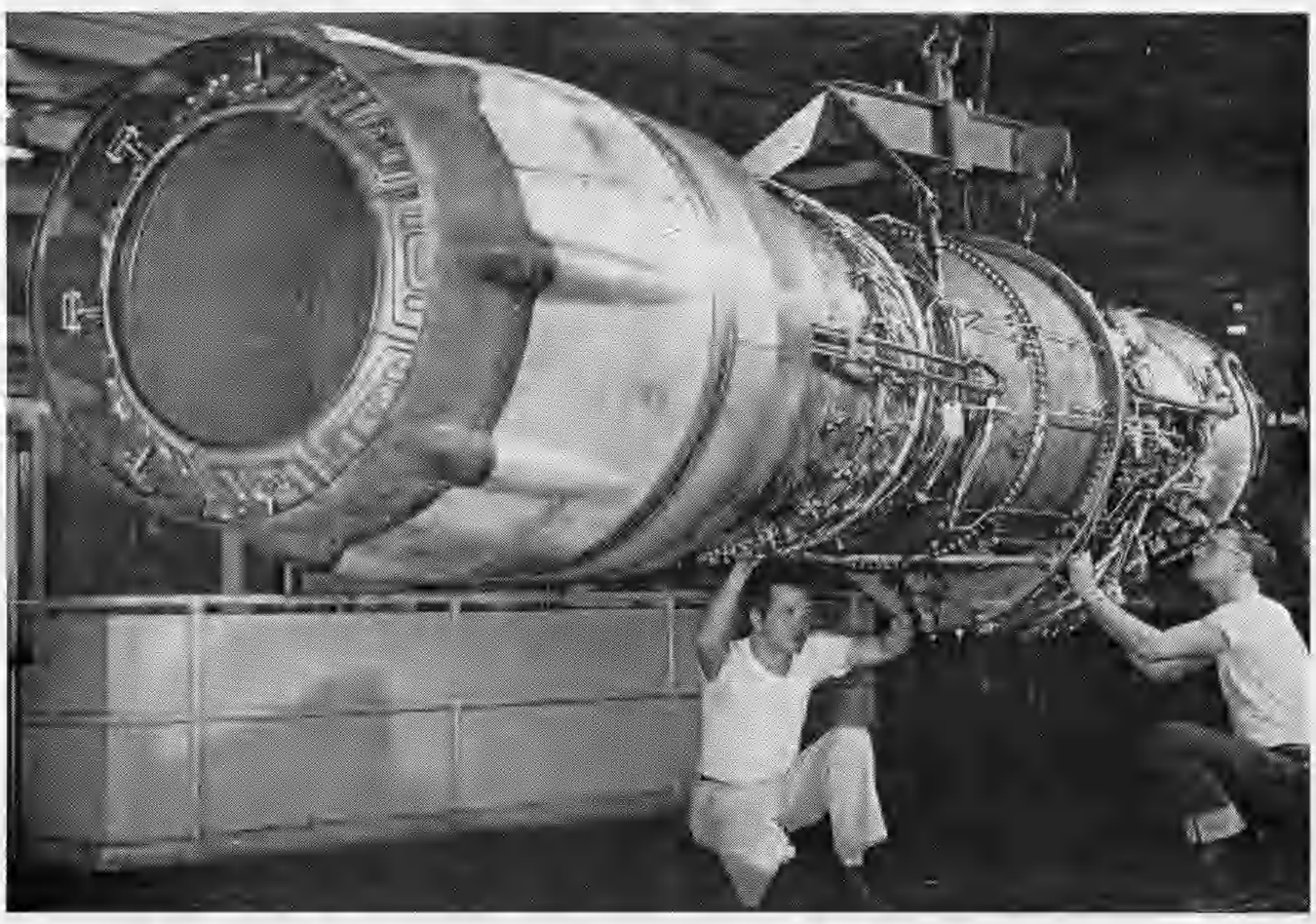
On the Runway . . .

In the Air . . .

With the announcement of the new F-101 Voodoo, developed by M.A.C. for the Air Force, M.A.C. could reveal that the reason for the heavy shroud of secrecy surrounding its operations at Edwards Air Force Base in California was that the new airplane was being flight tested there. Above the F-101 is shown, left, as it appeared prior to take-off during one of the flights, and, right, as it was "caught" in the air from a C-46 during flight by M.A.C. photographer Bill Schmidt.

J-57 Engines, Afterburners Power Voodoo



A J-57 engine with afterburner is pictured above in the Pratt & Whitney plant at East Hartford, Connecticut, as two employees of the firm tighten nuts and bolts prior to shipment to customers. One of the "customers" is M.A.C. which uses two J-57 aircraft engines with afterburners in each F-101 Voodoo.

What powers the new F-101 Voodoo?

M.A.C.'s new jet has two turbojet engines with afterburners, designed and built by Pratt & Whitney Aircraft Division of United Aircraft Corporation.

The J-57 has a basic rating in the 10,000-pound thrust class. With the afterburner, a tube-like device in which additional fuel is injected and burned in the turbojet exhaust, the engine's power is increased tremendously. The great thrust produced by the afterburner engine provides the power for supersonic flight.

The J-57 is the most powerful turbojet engine known to be in production. The Air Force, in announcing the engine, said that it has the "lowest specific fuel consumption of any turbojet engine presently in production for the Air Force."

Design of the axial-flow engine incorporates an arrangement of dual compressors in line, which gives the engine a high compression ratio and unusual fuel economy. The fuel economy of the J-57 engine is as important a feature as its high thrust. These advantages are gained through the basic dual - compressor design, which was selected—and then made to operate effectively—for the J-57.

Separate compressor units each rotate independently on concentric shafts turned by different turbines. The arrangement has been described as "two engines in one." Each of the compressor-turbine units works independently of the other, allowing the engine to start quickly and easily and to operate efficiently over a wide speed area. This enables the engine to gain added range from its low rate of fuel consumption and greater power from its high compression ratio.

The J-57 has been in production at Pratt & Whitney Aircraft's East Hartford, Connecticut, plant since February, 1953.

Make Christmas Merry at Dance

Have fun and do your bit to make a child's Christmas merrier, too!

The way to do both is to attend the company-wide Christmas Dance, sponsored by the MACtivities Council, at the Murray Memorial Hall, 6141 Etzel, on Saturday night, December 18. Dancing will be from 9 p.m. to 1 a.m.

Here's how you can do your bit: admission to the dance is a donation of $1.00 per person and a toy. The toys collected from those who attend will be given to the Salvation Army for distribution to needy children at special Christmas parties.

All McDonnell employees, their families and friends are invited to attend the dance. A special guest is also invited—Santa Claus!

For further details call the Recreation Office, Station 2336 or 2337.

Twelve Employees Are Promoted

There were four promotions made from hourly to salaried classifications involving three departments, and three classification changes made during the period of October 13 through November 12. There was one new assignment in the Engineering Division.

HOURLY TO SALARY

Asst. Field Service Representative
Thomas L. Plein

Asst. Foreman—Factory Transportation
Curtis A. Van Alstine

Asst. Foreman—Inspection
Kenneth W. Thompson

Field Service Representative
Robert Andrews

CLASSIFICATION CHANGES

Asst. Foreman—Factory Transportation
William J. Taylor

Foreman—Factory Transportation
William N. Kennedy

Methods Engineer
Robert H. German

NEW ASSIGNMENTS IN ENGINEERING DIVISION

Project Administrative Engineer, AED
Louis A. Perrin

Voodoo's Origin

(Continued from Page 1)

gineer on the XF-88 but also project engineer on the F-101.

In retrospect, he says: "The morale and the enthusiasm of the entire engineering crew working on both the XF-88 and the F-101 were certainly conducive not only to the best performance of the airplanes but the best performance of the people."

Art Matthews and Herman Cole are also "veterans" of both projects and have worked on both the XF-88 and F-101 as assistant project engineers. Group leaders and staff engineers who have worked on both projects are Ed Peters, Lester Eash, R. W. Lowe, Joe Barnhill, Bert Schilling, Don Irwin and Vince Zimmerman.

"Penetration" Fighter

Although the development contract for the XF-88 was awarded eight years ago, studies leading to the design of the XF-88 were begun even earlier, having been undertaken on the basis of informal Air Force requirements for a new type "penetration" fighter.

The major requirements were for long range and high performance and seemed to be in conflict with one another.

Preliminary solutions led to characteristics of an airplane which were similar to the XF2H-1, then being developed for the Navy. But with the decision to locate the two J34 engines, chosen to power the new airplane, in a different location than in the early Banshee, the XF-88 Voodoo began to take on an appearance which was uniquely its own.

When design of the XF-88 Voodoo had finalized to the point of a first flight, the Voodoo had thin wing and tail surfaces to literally knife through the air and reduce the effects of drag to an absolute minimum. Wings were swept back sharply at an angle of 35 degrees to reduce compressibility effects. The airplane weighed approximately 20,000 pounds, was 55 feet long and had a wingspan of approximately 40 feet.

The problem of maintaining the new airplane adequately had been given unusual consideration. Engines were placed in easily accessible positions; and armament, fuel and electrical systems were so designed that rapid repairs or major overhauls could be accomplished with relative speed.

When work was finally completed on the XF-88 Voodoo, engineers and others who had worked on it were happy to learn that it had been evaluated as the best of the three "penetration" fighters developed to meet the Air Force requirements. But they were disheartened to learn, too, that the Air Force need for the fighter was no longer of prime importance.

Though it was never put into production, the XF-88 Voodoo, because of its outstanding performance, was the logical parent of the F-101. In fact, when a development contract was received for the F-101 in 1952, it was decided to retain the XF-88's excellent supersonic aerodynamic characteristics. Some of these were the wing area and wing planform, tail planform and the side by side arrangement of the engines.

But these decisions were not made without thorough study. In the proposal stage of the F-101, the following were done: weight and balance of the airplane were carefully analyzed; aerodynamic experts studied configuration carefully, keeping in mind minimum drag, local interferences, internal air entrances and exits, as well as the estimating of performance and stability; stress experts examined the plane carefully to be sure it was possible or practical to get adequate structure throughout the airplane to carry the loads; dynamics experts examined it, made rough calculations and recommendations on such things as flutter, vibration and other aeroelastic effects; members of a thermodynamics group made recommendations on such things as duct efficiency for engines, heating effects due to ram and engine blast on the aft fuselage; and finally specifications writers described in detail the airplane submitted to the Air Force.

Even after the initial proposal stage, the specifications and basic design were co-ordinated with various laboratories at Wright Field for conformance with thousands of Air Force specifications in existence, the latest up-to-the-minute equipment, a reasonable estimated weight and performance, and structural design criteria.

Design Departures

After months of effort and coordination, agreement was reached on the basic design of the F-101 and detail design begun. Thousands of engineering manhours have gone into the specific design and development of each major and minor component of the new airplane within the last two years.

In the course of things, there were many departures from the XF-88 design, notably that the wings were made thinner, the size and location of the tail were altered considerably, and engines were moved farther forward in the fuselage. These changes necessitated the many other alterations made in placement of equipment, systems and even other major components of the airplane.

In some respects, the F-101 seems little like its parent, the XF-88. Yet if the engineers who worked with dedication on the F-101 hadn't had the reservoir of experience on the XF-88 to draw upon, the first flight of the F-101 would not have come so soon.

Nor could the success of the first flight have been forecast with such accuracy.

Navy Cancels 248 Demons; J71 Delay

The U. S. Navy has announced a cancellation of about $100,000,000 in contracts for 248 F3H-2 Demon fighters, both night fighter and photographic versions, because of the delay in development of the J-46 and J-71A2 engines which power the airplane.

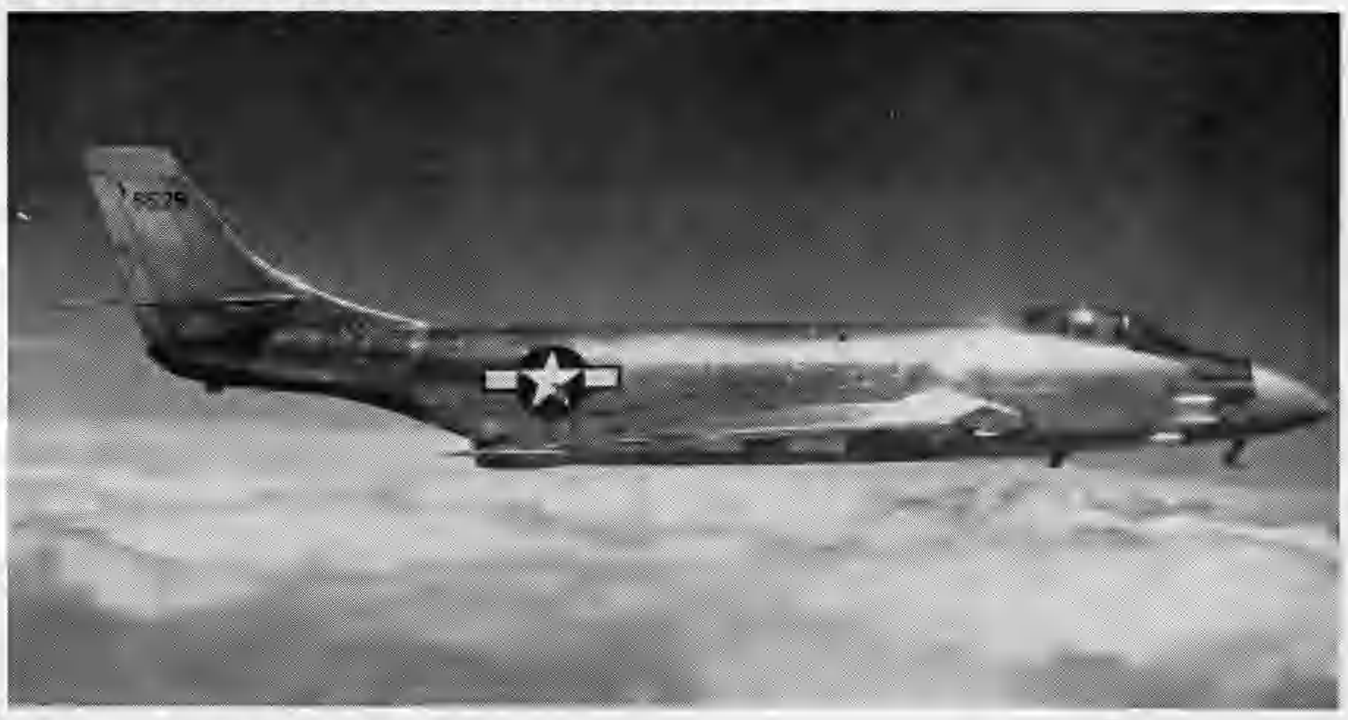
The announcement was made in connection with Navy cancellation of $372,000,000 in contracts for both the Demon and the Chance Vought A2U-1 attack version of the F7U-3 Cutlass fighter.

A substantial total of 280 F3H-2 Demons still remain on order; and the cancellation for a part of the overall contracts for these airplanes will not affect plans for present continuous employment of teammates.

In Sympathy

The entire team extends its heartfelt sympathy to Nancy Warmington of the Engineering Library on the loss of her father and brother.

The XF-88A Voodoo . . .



The XF-88B Voodoo . . .

CONCEPTION OF THE F-101 Voodoo occurred with the firm design of an earlier Voodoo model, the XF-88. In the picture above, the XF-88A Voodoo is shown during a routine flight several years ago. In the picture below, the XF-88B, a turboprop research version of the Voodoo, is shown during a routine flght test at M.A.C. before the airplane was turned over to the Propeller Laboratory at the U. S. Air Force Air Research and Development Command's Wright Air Development Center in Dayton, Ohio.