"Pinch-Waist' Plane Lifts Supersonic Speed 25%"

New Design Eases the 'Drag Rise' at Sound Barrier

BY ALVIN SHUSTER

WASHINGTON, Sept. 11—The Government said today that a new pinch-waisted design in military aircraft had produced increases up to 25 per cent in supersonic speeds.

The National Advisory Committee for Aeronautics reported that the new fuselage shape had been developed a few years ago but had been guarded by "unusually stringent security precautions that military aircraft utilized the new contours had been known to some time. But the reasons they were so shaped had not been revealed officially until today.

The committee, the principal Federal agency for aeronautical research, said the concept involved the pinching of the airplane's fuselage at the point where the wings were attached. It said this design reduced "very greatly" the "drag rise" that occurred at speeds that approached and went beyond the "sound barrier." This in turn enabled the

The Air Force's prototype YF-102, all-weather jet interceptor, with straight-line fuselage

The production version of same plane by Convair, F-102A, with new pinch-waisted design

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an aircraft to go faster without an increase in power.

"drag rise" is the increase in the resistance of the air to the forward movement of the aircraft at transonic speeds—so named because of the buffetting or buffeting between 600 and 800 miles an hour. The speed of sound at sea level is about 760 miles an hour and decreases at higher altitudes. Creation of the development of the new concept went to Richard T. Whitcomb, 34-year-old scientist at the N. A. C. A.'s Langley Aeronomical Laboratory at Langley Field, Va.

The committee said Mr. Whitcomb's discovery had provided a powerful simple and useful device for designing new aircraft, with dramatically improved performance. The aviation press gave additional praise.

Applied To Two Jets

On industry magazine called the development of the most significant military scientific break-throughs since the atomic bomb. Another said it was one of the most important military airplane design break-throughs in the last decade.

Mr. Whitcomb said the Air Force had the concept. On the Columbia Broadcasting System's television program "Face the Nation" the Secretary of Defense committed the Federal government to finance research and development of the "kind of break-through that makes fundamental advances in research so very important.

Made available on a classified basis to the aviation industry in June 1953, the new principle already has been applied to two supersonic military jet aircraft: the Grumman F-11F-1, a high-speed Navy plane, and the Convair F-102A, a Air Force delta wing intercepter. Both flew this last year.

The new concept also will be used in the Navy's Chance-Vought F-8U-1 intercepter soon to go into production. Informed sources reported to the Defense Department was planning an entire family of the supersonic-winged aircraft.

Rushed at home at Hampton, Va., Mr. Whitcomb said the new design could be an important step in the development of economical passenger air travel at supersonic speeds.

Major Obstacle Cleared

One of the major obstacles to such air travel now, he said, is the "drag rise" encountered by the fast-moving airplane. The costly fuel would be needed by the large transonic aircraft to overcome the increased drag.

Following the principle to the more smoothly over the craft, he went on the "cone-bottle" or "Marilyn Monroe" airplane required to overcome this resistance. This in turn increases the airfoil's range, and its operation becomes "quicker than a flash and more efficient than a flash." Mr. Whitcomb, a native

Evevation, Ill., began work on the project in 1951 in the first of N. A. C. A.'s transonic wind tunnels at the Langley Laboratory.

In tests with model airplanes in the eight-foot tunnel, he studied the effects of the increased drag at transonic speeds on the wings, bodies, tail surfaces, and other parts of the airplane as a whole, rather than separately.

This, the advisory committee said, was the "key" to the new concept, which it called the "area rule."

In his work, Mr. Whitcomb imagined a theoretical "body of revolution," or a streamlined airplane to a point where the wing no longer cut outside. He compared the shock wave pattern against this ideal shape with that against airplane wings and fore and aft of the cross-sectional area of the "body" and the cross-sectional area of the model plane with the wings attached.

From these complex wing-body studies, the principle of narrowing the fuselage at the point of attachment to the wings was attached to make for smoother air passage.

In this way," the committee said, the "area rule" has been applied to the fuselage and the wing together become the same as it would be for the streamlined fuselage.

The result was less drag.

Findings Are Verified

Tests with rocket-powered model aircraft at the committee's pilotless aircraft research station in Virginia later verified the tunnel findings.

The committee said that for eighteen months aeronautical magazines had been aware of certain aspects of the new concept and its application to the new military aircraft. It said, when advised of the "vital nature of the subject" the aviation press withheld the material.

Dr. Hugh L. Dryden, committee chairman, said, "Additional editing of this information stood as an example of "patriotism and editorial integrity."

Dr. Dryden, however, made no mention of the publication by Aero Digest of this week's story on the subject of the new concept.

Fred Hamlin, the magazine's publisher, said he had released the story after he had learned that other newspapers were planned to release it Sept. 19, about the time a rival magazine, Aviation Week, had scheduled publication of a full story on the subject.

Mr. Whitcomb, who has been with the N.A.C.A. since March, 1943, is now assistant head of the experimental department, one of the three at the laboratory.

He joined the research staff in 1945, and has worked "with high distinction" from the Worcester, Mass., Polytechnic Institute and specialized in high-speed research and development of aircraft for the nation's fighting forces.

His discovery brought him the 1953 TWA Milestone Award for outstanding performance in