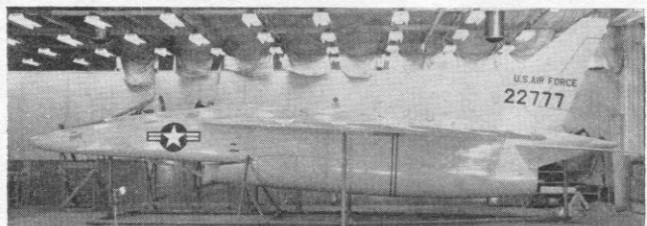


All photos show N-102 mock-up



Northrop N-102 Fang Project

by Hugh W. Cowin

TOWARDS THE END of 1952 Northrop, as a private venture, started work on the design of a lightweight Mach 2 interceptor, the N-102 Fang, and at the same time projected a two-seat variant for combat proficiency training. Close liaison was naturally maintained with the N.A.C.A. and U.S.A.F.

The Fang was designed to meet requirements similar to those that led to the U.S.A.F.-sponsored Lockheed F-104, and in a design sense the Fang can be said to be a true contemporary of the Starfighter.

The Fang embodied several advanced features in an airframe of rugged simplicity. Basically a delta, it broke with standard American practice by carrying a small slab tailplane, positioned immediately aft of the wing. Pronounced conical camber was introduced on the leading edges of the sharply swept mainplane, which had a span of 30 ft. 8 in., and the ventral variable-geometry engine air intake selected was almost identical in appearance to that of the proposed Hawker P.1121 of 1956.

Probably the most controversial feature of the Fang was its tailplane, which might be considered an encumbrance, particularly when Northrop's pioneer work in the design of all-wing aircraft is remembered. However, a separate tailplane would improve low-speed handling, short-field operation, and longitudinal control throughout the whole of the aircraft's speed range. These advantages—coupled with the bonus

of simpler flying controls to be fitted within the confines of a thin wing—would, it was felt, more than compensate for any small performance penalties incurred by the increase in drag and weight.

Another noteworthy point of the design was the choice of a ventral intake to feed the engine. This position was chosen primarily to overcome excessive losses in motor efficiency brought about by boundary-flow stagnation in the intake trunking. The ventral position also simplified the problem of designing a variable-geometry intake; although against this was the hazard of ingesting stones and other material during take-off. A subsidiary advantage of the low-mounted engine was ease of access for servicing.

Four alternative motor installations were proposed, each necessitating some change in the contours of the lower fuselage. Here, interchangeability was the keynote, and much of the lower fuselage consisted of the engine nacelle which could house: a Pratt & Whitney J-57; a Wright J-65 with, or without, afterburning; or the then new General Electric J-79—with which powerplant it was hoped that the fighter would easily exceed Mach 2.

Design of the N-102 had reached an advanced stage by the close of 1954, work having also been undertaken to draw up the tandem-seat trainer version which would have been 45 ft. 5½ in. long compared with the fighter's 42 ft. 10 in. Eight different armament installations had been proposed, including the rotary Vulcan cannon. The aircraft's all-up weight varied from approximately 15,000 lb. to 18,000 lb. depending upon the choice of role and equipment fitted. The Fang's wing area of about 270 sq. ft. (more than 1½ times that of the Starfighter) would give wing loadings commensurately lower, in the region of 56 to 67 lb./sq. ft., depending on all-up weight at take-off.

The reasons which led to the shelving

of this project were varied. There were, of course, certain technical and operational considerations, but equally important were the changes then taking place in the corporate sphere, under the dynamic direction of Tom Jones, who today sits as president of the widely diversified Northrop Corporation. Jones, if *Time* magazine is to be believed, urged the dropping of Fang in favour of the far cheaper N-156 design which has since furnished the company with two notably successful aircraft in the T-38 Talon and the F-5A.

Acknowledgment.—David Nuffer.

