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FOREIGN TECHNOLOGY DIVISION

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BACKFIRE SUPERSONIC PERFORMANCE (U)

D. L. Ritchey (PDXO)

BACKGROUND

(S) BACKFIRE B is being deployed to both LRA and SNA units and it is estimated that 40 airframes have been produced. It is likely that a single design is being built to carry either two ASMs or bombs or a combined load. A winged AS-4-type ASM, pylon mounted, can be fitted under each fixed wing section just outboard of the main landing gear. The provision leaves the center fuselage clear for the probable bomb bay. The AS-4-type ASM on the aircraft probably incorporates internal improvements over the AS-4 ASM on BLINDER including the capability for low altitude launch.

(S) BACKFIRE B's supersonic performance has not been published since supersonic drag was being reassessed. Assessed supersonic drag has been increased and supersonic mission range and radius decreased; subsonic performance remains unchanged. It is believed that the design of the aircraft is optimized for long-range cruise and low-altitude penetration at high subsonic speeds. Supersonic afterburning fuel consumption is high, indicating the supersonic capability will be used primarily on intermediate range missions. The supersonic data presented here is for an internal bomb load, since it is believed that operational supersonic flight with two wing-mounted ASMs is unlikely.

PERFORMANCE LIMITS

(S) It can be confidently stated that BACKFIRE B, clean, has a Mach 2.0 dash capability above 40,000 feet. At low altitude (below 2000 feet) it has no supersonic capability, with either missiles or bombs, and maximum Mach is believed to be about 0.85.

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PERFORMANCE WITH MISSILES

(S) Calculations indicate BACKFIRE B, with two wing-mounted AS-4-type missiles, has sufficient thrust to fly supersonically. Evidence is not available, however, to determine the limit Mach number with missiles. It is our judgement that BACKFIRE B may be tested with missiles at slightly supersonic speeds (up to about Mach 1.3) but that operational launch at supersonic speeds is not likely. This judgement is based on the excessive fuel consumption required to accelerate the aircraft with two missiles to supersonic speeds and the limited benefits it would offer. Calculations indicate, for example, that at a BACKFIRE B flight weight of 280,000 pounds, some 16 minutes and 42,500 pounds of fuel will be required to accelerate from Mach 0.8 to Mach 1.5. The distance flown while accelerating would be 195 NM, but had this fuel been used in subsonic flight about 1295 NM could have been flown. In addition, structural or stability and control limitations may apply to BACKFIRE when two missiles are carried.

SUPERSONIC PERFORMANCE

(S) Supersonic mission performance is therefore presented for a clean BACKFIRE B with a 20,800-pound bomb load, 700 pounds of chaff, and 450 pounds of ammunition. Figure 1 shows the BACKFIRE B ASM carrier/bomber, and Figure 2 shows the effect of varied Mach 2 dash distances on mission radius. Figure 3 tabulates mission performance for a 200 NM symmetric dash and an all-supersonic mission.

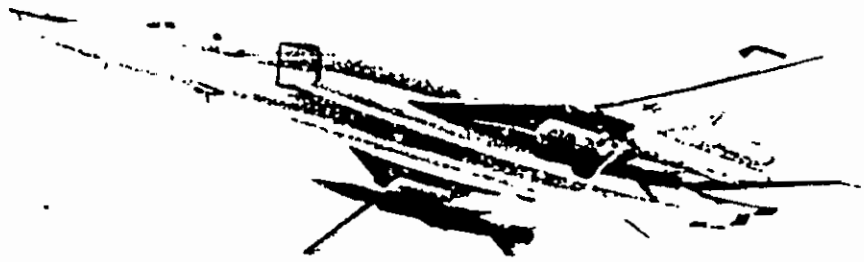

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Fig. 1 BACKFIRE B ASM Carrier/Bomber (U)

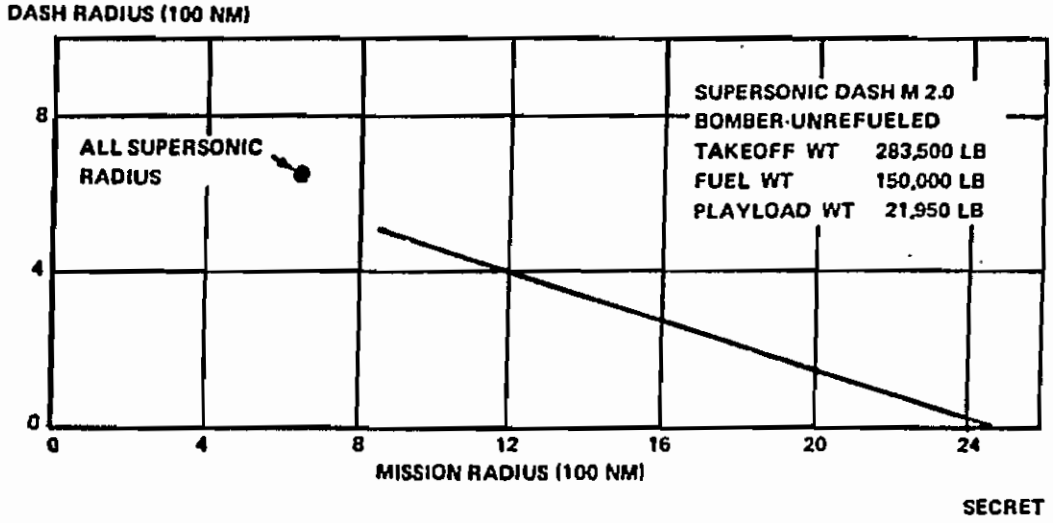

Fig. 2 Dash Tradeoff Data - Clean (U)

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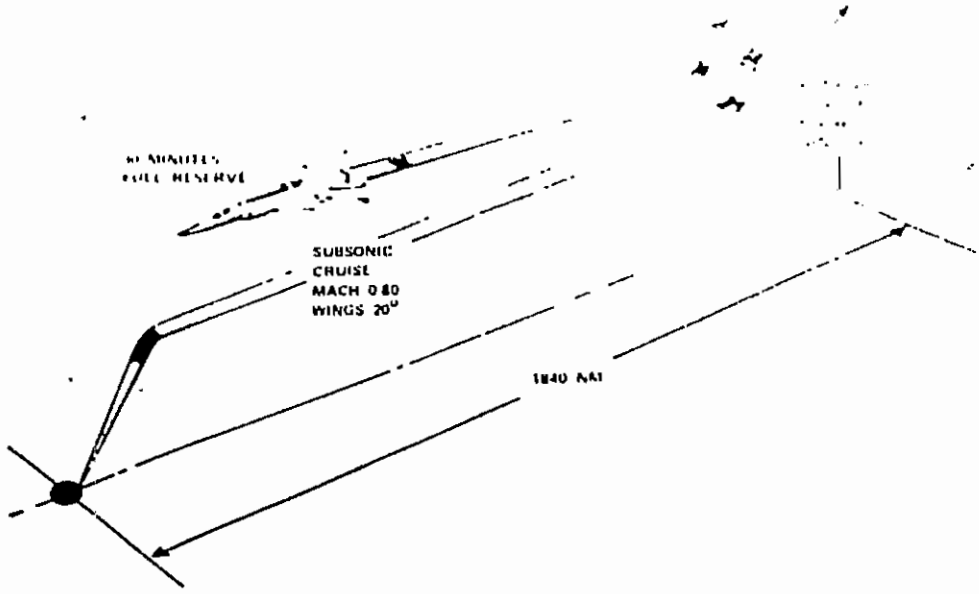

		Bomber 200 NM Supersonic Dash	Bomber All Supersonic
Takeoff Weight	(lb)	263,500	263,500
Fuel at 6.9 lb/gal	(lb)	150,000	150,000
Payload (Bombs)	(lb)	21,950	21,950
Wing Loading	(lb/ft^2) 3	105	105
Takeoff Ground Run at SL	(ft) 1,3	4,550	4,550
Rate of Climb at SL	(fpm)	3,500 (2,3)	19,400 (1,4)
Combat Range	(NM)	4,010	1,210
Combat Radius	(NM)	1,840	650
Average Cruise Speed	(kn)	460	1,148
Initial Cruising Altitude	(ft)	27,500	46,500
Target Speed	(kn)	1,148	1,148
Target Altitude	(ft)	53,400	53,000
Total Mission Time	(hr)	7.3	1.2
Combat Weight	(lb)	157,800	162,100
Combat Altitude	(ft)	53,400	53,000
Combat Speed	(kn)	1,148	1,148
Combat Rate of Climb	(fpm)	2,725	2,665
Service Ceiling (100 fpm)	(ft)	56,100	55,500
Max Speed at Opt Altitude	(kn/M)	1148/2.0	1148/2.0

NOTES: (1) Max A/B (2) Maxnon (3) Unswept (4) Swept

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Fig. 3 Tabulated Mission Data - Clean (U)

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