

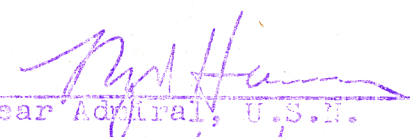
Aircraft Spec. Br.

Aer-AC-38
NOa(s) 10414

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MOCK-UP BOARD REPORT
FOR
MODEL XA3D-1
CONTRACT NOa(s) 10414

APPROVED:


Rear Admiral, U.S.N.

DATE: 10/27/49

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Subj: Mock-up Board Report for model XA3D-1

- Encl: (1) Daily Summaries of Mock-up Board Decisions
dtd 12, 13, 14, 19 and 20 Sept 1949
(2) Appendix 1 to Spec. SR50E, Mock-up Check-off
List, General
(3) Appendix 2 to Spec. SR50E, Mock-up Check-off
List, Cockpit
(4) Appendix 3 to Spec. SR50E, Mock-up Check-off
List, Propulsion System
(5) Appendix 4 to Spec. SR50E, Mock-up Check-off
List, Airborne Equipment
(6) Appendix 5 to Spec. SR50E, Mock-up Check-off
List, Electrical and Electronics
(7) Appendix 6 to Spec. SR50E, Mock-up Check-off
List, Armament
(8) Appendix 7 to Spec. SR50E, Mock-up Check-off
List, Ships Installations
(9) Photographs

1. Mock-up Inspection Board.

The mock-up of the model XA3D-1 was inspected by the board at the Douglas Aircraft Company, Inc., Plant EL Segundo, Calif. during the period 12 through 22 September 1949. The mock-up of the XA2J-1 was inspected alternately during this period by the same board at the North American Aviation, Inc. plant. The board was constituted as follows:

Capt. D.G. Donaho	Armament Div.
Cdr. J.A. Thomas	Piloted Aircraft Div. VA Design
Cdr. R. E. White	Power Plants Div.
Cdr. H. A. Lohmann	Cockpit Development Co-ordinator
Cdr. H. H. Avery	Military Requirements Div.
Cdr. R. S. Rogers	Armament Div.
LCdr. R. E. McHenry	Electronics Div.
LCdr. S. N. James	Airborne Equipment Div.
LCdr. J. P. Spieker	Maintenance Div.
Lt. W. W. Schaefer	Power Plants Div.
Mr. W. Z. Frisbie	Evaluation Div.
Mr. E. D. Armstrong	Airborne Equipment Div.
Mr. R. L. Creel	Design Elements Div.
Mr. G. A. D'Onofrio	Ship Installation Div.

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The board was assisted by the following official observers:

Capt. J. S. Early	Military Requirements (Avia. Med.)
Cdr. E. Tatom	Bureau of Ordnance
Cdr. C. T. Booth	Military Requirements Div.
Cdr. H. N. Funk	NATC Patuxent - Tactical Test
LCol. G. J. Weissenberger, USMC	Military Requirements Div.
LCol. W. R. Smith, USA	Armed Forces Special Weapons Proj.
LCdr. E. Krebsbach	CNO - OP-36
LCdr. H. Wood	Piloted Aircraft Div. VA Design
LCdr. W. C. Wilburn	Design Elements Div.
LCdr. H. J. Trum	Bureau of Ordnance
Lt. C. C. Shirley	Photographic Div.
Lt(jg) J. M. Evans	Maintenance Div.
Mr. G. V. Deits	Technical Data Div.
Mr. J. J. Phelan	Technical Data Div.
Mr. R. R. Francis	Piloted Aircraft Div. VA Design
Mr. D. P. Samson	Production Div.

In addition, personnel representing AFSWP, Sandia Base, Squadron VC-5, and Norden Laboratories were present for technical assistance.

2. General Description of Airplane.

The KA3D-1 is a three place, long range, high performance aircraft designed to conform to the planned capabilities of the CVB carriers and to operate with restrictions from the present CVB carriers. The airplane is a conventional swept wing structure with two J40-WE-12 turbo-jet engines enclosed in under-wing nacelles. Speed brakes are incorporated to allow rapid descent from altitude and rapid deceleration at sea level. Two 20 mm guns in a radar controlled tail turret are provided. The salient performance characteristics are:

Take-off Gross Weight - lbs.	68,000#
Combat Radius - N. Mi.	1450
V Cruise - MN./KN.	.85/490
Combat Altitude - Ft.	44,500
V Max/S.L. - Kn.	593
V Max/40000' - Kn.	521
Bomb Load - Lbs.	6,000#

Although the basic bomb load is 6,000#, strength provisions are adequate for an 8,000 # bomb load and full internal fuel. The crew of three is accommodated in a pressurized cabin. Normal access and egress of the crew is made by means of a chute located

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forward of the bomb bay. This chute also provides a successful means of emergency escape as proven by recent tests with the XF3D escape chute. The development of the XA3D-1 and the XA2J-1, although designed for separate operational requirements, has presented many common design problems. The co-ordination between the contractors, Douglas and North American, while considering these problems, plus the alternate inspections of these aircraft by the Mock-up Board, has produced effective results.

3. Major Points of Discussion During Inspection.

a. Cockpit

The location of the landing gear and flap control levers presented a debatable item. Squadron VC-5 representatives recommended that these controls be located in the center of the cockpit, making them available to both the pilot and the assistant pilot. The duties of the assistant pilot regarding the operation of the aircraft are to be those of a relief pilot rather than a co-pilot. Present cockpit standardization requires the wheel and flap controls be located on the pilots left side in carrier airplanes with single pilots. It was pointed out that increased operational ease would result from the assistant pilot having control of the landing gear and flaps. After having these controls mocked up in both locations, and thoroughly considering the merits of each, the Board decided by majority vote in favor of the standardization requirements with the controls at the pilot's left. The problem will be presented to the Cockpit Development Panel and to joint cockpit standardization at a higher level.

b. Brake System

Installation of an emergency brake system was considered necessary. The use of the escape hatch emergency air bottle with a separate cockpit control was recommended for this system. The contractor was also asked to consider the brake system designed by North American for the XA2J which enjoys the use of two separate hydraulic systems. A parking brake will also be required for the airplane.

c. Aileron Control Wheel Force and Travel

The Board considered that the maximum lateral control wheel force should not exceed 30 pounds with boost off to give a minimum rolling velocity of 15 degrees per second at all speeds between 1.15 Vs. and 1.4 Vs. The maximum aileron control wheel travel shall be limited to 90° at full throw. The contractor was requested to develop a control system to accomplish this requirement and submit the study to the Bureau of Aeronautics for approval.

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d. Fuel Evaporation Loss.

Under normal operating conditions the fuel loss due to boil-off during and after climb to cruise altitude will approximate 5 to 10 percent of the total fuel. The reluctance of this fuel to be condensed without a significant amount of pressure increases the scope of this problem. Other methods discussed to prevent this loss of fuel include pre-cooling the fuel prior to take-off and pressurizing the fuel in the tanks. The problem was left with the contractor for study.

e. Armament

(1) The center line bomb bay adapter used to accommodate multiple bomb, mine, and torpedo loads requires the use of a pit or elevator over which the preloaded adapter can be raised into the bomb bay. With the adapter installed prior to loading the stores, space limitations within the bomb bay prevent ease of loading the final stores. Due to the above requirements of the present adapter, the contractor was requested to submit a study of alternate armament installation methods.

(2) The present system of crew controlled ejection of the cylinder in the bomb bay appears inadequate. Ditching or a similar emergency should result in the ejection and rescue of this cylinder. To this end the use of an automatic system hydrostatically operated was discussed as a possible solution. The Board voted in favor of further study of this problem by the Bureau of Aeronautics.

4. Paragraph 3.325 of the XA3D-1 detail specification requires the airplane to be considered to land in a 5 degree roll altitude in lieu of the one wheel landing condition of ANC-2a. The effect of weight over and above the ANC-2a requirements is not included in the weight empty of the detail specification. This weight increase has been determined by the contractor to be 500 lbs. This item was not discussed by the Mock-up Board during the inspection of the airplane.

5. The following is an itemized list of estimated weight changes for those approved Mock-up Board changes involving weight:

<u>Item No.</u>	<u>Subject</u>	<u>Est. Wt. Increase</u>	<u>Est. Wt. Decrease</u>
4	Additional provisions for oxygen bottles	12.8	

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<u>Item No.</u>	<u>Subject</u>	<u>Est. Wt. Increase</u>	<u>Est. Wt. Decrease</u>
5	Delete coiled cord microphone and headset jacks requirement from specification for crew positions		- 2.1
7	Install parking brake	/ 20.0	
10	Provide suitable foot wells for ass't pilot	/ 4.0	
56	Install fuselage inspection hole for 14A bomb shackle and install light for illuminating shackle.	/ 3.0	
57	Provide two air pumps for bomb bay requirements	W.E./ 4.0 U.L./ 11.0	
64	Install utility receptacle at #3 position console. Install scope visor for use by pilot and ass't pilot.	/ 2.0	
65	Provide warning light to indicate failure of primary hydraulic boost system	/ 1.0	
69	Provide rack for stowage of ASB-1 handling gear	/ 1.0	
76	Provide emergency brake installation	/ 14.0	
79	Remove barrier guard		- 20.0
80	Provide for towing, tie down, and jack pads on main gear. Provide for tie down on nose gear and wings inboard of nacelles	/ 2.0	
Totals		/ 74.8	- 22.1

6. The Board approves the mock-up as changed by items listed in enclosure (1).

Copy to:
 Chief, BuAer (less check-off lists) (File)
 Head, Attack Design Br. (complete)
 Aircraft Specifications Br. (complete)
 BAR, Douglas, El Segundo (less photographs)(2 copies) 1 for Douglas

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Distribution List:

One copy (less photographs and check-off lists) to each of the following:

Ass't Chief for Design and Engineering Group
Military Requirements Div.
Director, Evaluation Div.
Cockpit Development Co-ordinator
Armament Div.
Power Plant Div.
Electronics Div.
Ships Installation Div.
Design Elements Div.
Airborne Equipment Div.
Maintenance Div.
→ Aircraft Specifications Branch
Board of Inspection and Survey
NATC, Patuxent River, Md.
ANC, Wright Field, Via BAGR, C.D.
BAGR, W.D.
Bureau of Ordnance
Naval Administrative Unit- Sandia Base
VC-5 NAS Moffett Field
OP-36 Pentagon

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