MILITARY SPECIFICATION

INSTALLATION OF ARMAMENT CONTROL SYSTEMS AND

ASSOCIATED EQUIPMENT IN NAVAL AIRCRAFT

This amendment forms a part of Military Specification MIL-I-8677(Aer) of 4 August 1954, and approved by the Bureau of Aeronautics, Department of the Navy.

Page 3, Paragraph 2.1: Under "SPECIFICATIONS", add the following:

"Military

MIL-W-5088	Wiring, Aircraft, Installation of
MIL-E-5400	Electronic Equipment, Airborne, General Specification for

Bureau of Aeronautics

XAR-54	Optical Sight Units for Naval Aircraft
SR-172	Seats, Ejectable, Design and Installation of"

Page 3, Paragraph 3.5: Change second sentence to read, "The aircraft contractor shall determine whether the armament control system components, vibration and shock design are compatible with the installation planned. If the component design and the planned installation are not compatible it shall be incumbent upon the aircraft contractor to supply and install the necessary mounts."

Page 3, Paragraph 3.6.1: Delete this paragraph and substitute the following: "3.6.1 Sight Unit:" Add the following new paragraphs:

"Paragraph 3.6.1.1: Space Provisions: Space provisions shall be provided near the top of the instrument panel for a sight unit of maximum external dimensions which is equal to 7.5 inches wide (a beam), 10 inches high and 11 inches long (fore and aft) unless a specific unit is designated.

Paragraph 3.6.1.2: Clearance: The contractor shall provide adequate clearance between the windscreen or other obstructing structures for a sight unit and reflector plate to assure satisfactory operation under the conditions listed below:

(a) Adjustment of the reflector plate for down leads equal to the maximum over the nose vision.

(b) Under all vibration conditions that the sight unit may be subjected to.

(c) Boresight adjustment of the sight unit in azimuth and elevation.

(d) Removal of all reticle lamps without removal of the sight unit.

(e) Removal of the sight camera.

(f) Clearance and accessibility to sight unit, test plugs or test points to permit accomplishment of rapid checks and tests as required.

Paragraph 3.6.1.3: Mounting: The sight unit containing the optics of the control system shall be mounted in an upright position on the centerline of the operating crew member's station. In VF aircraft, the sight unit shall be mounted in the vertical center plane, directly in front of the pilot and as far aft as possible, but clear of the ejection envelope, and recessed so as to provide minimum obstruction for forward and over the nose vision. The sight unit shall be so positioned in the aircraft that the center of the zero lead bundle passes 1 inch above the pilot's normal eye position. (The pilot's normal eye position must provide a minimum 11° down lead and clear around the clock visibility.) With the operator's seat in the mean position, the line of sight of the sight unit, when properly aligned, shall be 30 in. ± 1 in. above the center of the top of the seat surface or top of the seat parachute pack, if specified for the aircraft (See Specification SR-172). The "eye-distance" shall be the fore and aft distance from sight head objective lens to the operator's eye. With the operator in combat position, (i.e. leaning slightly forward in the seat in a position which will permit him to move his eye position fore and aft and upward and downward sufficiently to keep the gunsight reticle pattern in view for downward lead angles of 250 mils, developed in the sight head), the eye-distance shall be a minimum (consistent with cockpit space and arrangement) to permit viewing of the entire reticle pattern with a minimum movement of the eyes. Minimum movement requirements compatible with the lead angles specified in 3.6.1.4 are defined as 12 inches forward, maximum, 3 inches up, 3 inches down or 2 inches to either side from the pilot's normal eye position or any combination of these distances. The "eye-distances" for each sight unit installation in each type aircraft shall be approved by the Chief, Bureau of Aeronautics prior to cockpit construction and installation. Secondary reticle images shall be eliminated by providing sufficient angle between the windscreen and the sight unit reflector plate. The reflector plates and reflector mounting brackets may be in the line of forward vision. The sight unit shall be mounted as necessary to insure that vibrations in excess of those prescribed in MIL-E-5400 are not transmitted to the sight unit. Consistent with the above requirements, the sight unit shall be so located as to present minimum hazard to the operator's head and face during crash conditions.

Paragraph 3.6.1.4: Optical Qualities of Windscreen: The windscreen shall be a flat plate with optical qualities in the sighting area of a maximum of 1.0 mil deviation for rays at 60° incidence to the glass. The flat plate shall be of sufficient size to permit optical sighting to be accomplished through the plate for lead angles of ± 10 degrees in azimuth and -15° and +5° in elevation. The flat plate shall not be used as a sight reflector plate.

Paragraph 3.6.1.5: Design of Sight Unit: Contractor furnished sight units shall conform to the requirements specified in Bureau of Aeronautics Specification AAR-54 and the applicable requirements contained herein.

Paragraph 3.6.1.6: Sight Unit Camera: Space and mounting provisions shall be incorporated for mounting a CGY-2 type camera, unless otherwise specified. The camera and mounting bracket shall be located clear of the ejection envelope and shall give minimum obstruction to forward vision. The installation shall permit quick change of camera magazine in flight and shall provide means of positive alignment of the camera with the sight unit reticle pattern. Sufficient clearance shall also be provided for the removal of the camera.

Paragraph 3.6.1.7: Boresighting: Boresighting adjustment shall be provided to permit adjustment of the sight unit in azimuth and elevation and to permit alignment within the accuracy range required.

Paragraph 3.6.1.8: Design Data: The contractor shall submit the following data with each proposed sight unit installation:

(a) All pilot's eye positions.

(b) All reference lines.

(c) Bundles of light rays for maximum up and down leads and zero lead.

(d) Expected displacement of sight optical axis during gunfire.

(e) Expected windscreen flexure due to cockpit pressure schedule, airspeed, and altitude.

(f) Boresighting adjustments provided.

(g) Specification of windscreen coating if applicable.

(h) Drawings of camera installations.

(i) Seat ejection envelope".

Page 4, Paragraph 3.11: Add the following, "Installation of cabling shall conform to the requirements of MIL-W-5088."

Page 6, Paragraph 3.13.3(h): Third sentence shall be changed to read, "There shall be diagrams of the boresight targets at 1000 in. ± 1 in. from front trunnion of the guns, ————————."

Page 7, Paragraph 3.13.3.1: In the first sentence after the word "curves" change to read as follows, "for cruising conditions, diving conditions and climbing conditions." After this sentence, add the following new sentence, "The contractor shall also furnish data relative to weight corresponding to aircraft weight plus variations of different stores carried plus:

(a) 50% of internal take-off fuel.

(b) 50% of internal and external take-off fuel."

Page 7, Paragraph 3.13.5(b)(1) Pitch plane alignment: Change to read, "VF Aircraft - All fixed guns and gun control systems shall be installed such that their mean boresight alignment is in the pitch plane and 2° below the low Mach number zero lift line. Unless specific deviation is granted, the guns and gun control system installation shall be adjustable to provide for alignment of 1° above and below the mean boresight alignment specified above. Unless other alignment (see 3.13.3(c)) is approved or required by the Bureau of Aeronautics, guns and gun control systems shall be aligned parallel to the mean boresight alignment."

Page 7, Paragraph 3.13.5(b)(2): Change last sentence to read, "Unless other alignment (see 3.13.3(c)) is approved or required by the Chief, Bureau of Aeronautics, guns and gun control systems shall be aligned 4° below the low Mach number zero lift line."

Page 7A, Figures 1 and 2: Change "Bombsight" to "Boresight".

Page 7B, Figure 3: Ordinate for larger figure shall be "$X = W \frac{\cos \theta}{V^2}$".

Page 8, Paragraph 3.14: Change "±160°" to "+160°".