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MILITARY SPECIFICATION

INSTALLATION OF ARMAMENT CONTROL SYSTEMS AND
ASSOCIATED EQUIPMENT IN NAVAL AIRCRAFT

This specification has been approved by
the Bureau of Aeronautics, Department of the Navy

1. SCOPE

1.1 This specification establishes minimum requirements for the installation of armament control systems and associated equipments for all types of weapons installed in naval aircraft. Installation details such as mounting space dimensions, drill patterns, etc. for the separate component equipments of the armament control systems are covered by other Bureau of Aeronautics or Bureau of Ordnance specifications and/or drawings. In addition to installation requirements, certain general functional requirements for components of the systems are contained herein. Also contained herein are certain test procedures applicable to the installations covered by this specification. Requirements for the alignment of weapons and associated control equipments are contained herein.

2. APPLICABLE DOCUMENTS

2.1 The following specifications, standards, drawings, and publications, of the issue in effect on the date of invitation for bids, forms a part of this specification.

SPECIFICATIONS

Federal

JAN-C-76 Cable (Hook-Up Wire) Electric, Insulated, Radio and Instruments

Military

MIL-B-5087 Bonding; Electrical (For Aircraft)
MIL-H-5473 Handbook; Erection and Maintenance (For Aircraft)
MIL-I-6051 Interference Limits and Methods of Measurement; Aircraft Radio and Electronic Installations
MIL-H-7700 Handbooks; Flight
MIL-I-8670 Installation of Fixed Guns and Associated Equipment
MIL-I-8671 Installation of Droppable Stores and Associated Release Systems
MIL-I-8672 Installation of Aircraft Pyrotechnics
MIL-I-8673 Installation of Flexible Weapon Systems
MIL-I-8674 Installation of Smoke Screen Equipment
MIL-I-8675 Installation of Aircraft Armor

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Military (Cont'd)

MIL-T-8676 Testing of Rocket Launchers

MIL-I-8700 Installation and Test of Electronic Equipment in Aircraft; General Specification For

2.2 Technical Information - It shall be the responsibility of the contractor to know in detail the theory and practical operation, installation, maintenance and operating requirements of each control system that he is required to install. The acquiring of such information shall be complete to insure a proper and efficient installation and shall be obtained from such sources as drawings, manuals, reports, etc., and/or liaison with the equipment manufacturer. Such liaison shall be effected by the contractor through the Bureau of Aeronautics.

2.3 Precedence - If the requirements of this specification and the applicable Aircraft Detail Specification are in conflict, the requirements of the Aircraft Detail Specification shall have precedence.

(When requesting specifications, standards, drawings and publications refer to both title and number. Copies of this specification and applicable specifications may be obtained upon application to the Commanding Officer, U. S. Naval Air Station, Johnsville, Pennsylvania, Attention Technical Records Division.)

3. REQUIREMENTS

3.1 General - The installation requirements specified herein pertain to all items of an Armament Control System, whether these items are Government furnished or contractor furnished. Specific components for which the requirements of this specification are applicable are not contained herein, but such information will be part of the Aircraft Detail Specification or other related Bureau of Aeronautics documents. The term control system, as used throughout this specification, refers to any armament system designed for the purpose of affecting the successful operation of armament weapons carried on naval aircraft.

3.2 Materials - Materials used in the installation of armament control systems shall be of the highest quality suitable for the purpose. The materials shall be in accordance with applicable specifications, if such materials are available. Selection and substitution (if necessary) of materials shall be made in accordance with requirements of Specification SD-2h, "General Specification for the Design and Construction of Airplanes for the United States Navy."

3.2.1 Standard Parts - Parts such as fittings, fastening devices, electrical connectors, shock mounts and other associated parts required for the installations shall be in accordance with AN Standards or other Military Specifications unless otherwise specified.

3.2.2 Wire - Wire used shall be in accordance with Specification JAN-C-76, "Cable (Hook-up Wire), Electric, Insulated, Radio and Instrument."

3.3 Required Systems and Equipment - The specific armament control system(s) and associated component equipments to be installed in any particular aircraft shall be as required in the applicable Aircraft Detail Specification. All Government Furnished Equipment shall be installed as furnished without modification except as specifically authorized by written approval from the Bureau of Aeronautics. (See 3.1.)

3.3.1 Installation of Flexible Weapons System - The installation of the specific flexible weapons system required shall be in accordance with MIL-I-8673(Aer).

3.3.2 Contractor Furnished Equipment - Requirements for Contractor Furnished Equipment will either be stated in the applicable Aircraft Detail Specification or established by the Bureau of Aeronautics by contractual means. All parts and equipment necessary for the proper operation of the system(s) which are not specified in the Aircraft Detail Specification as Government Furnished shall be furnished and installed by the contractor as required. Installation of contractor furnished parts and equipment will be subject to Bureau of Aeronautics approval. Use of new type equipment proposed by the contractor will be considered by the Bureau of Aeronautics, but shall not be installed in lieu of specified Government Furnished or approved type Contractor Furnished Equipment unless specifically approved by the Bureau of Aeronautics.

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3.3.3 Test Equipment - The contractor shall inform the Bureau of Aeronautics as to what Government furnished test equipment is needed to check the system components before and/or after installation to insure that the operation of the equipment has not been impaired due to improper installation or location.

3.4 Required Weapons and Related Equipment - The types of weapons and related equipment for which the control system(s) in each aircraft must operate will be specified in the applicable Aircraft Detail Specification.

3.4.1 Aircraft Armor - Aircraft armor shall be installed in accordance with the requirements contained in MIL-I-8675(Aer) unless otherwise specified.

3.4.2 Fixed Guns - All fixed guns shall be installed in accordance with the requirements contained in MIL-I-8670(Aer) unless otherwise specified.

3.4.3 Pyrotechnics - All pyrotechnic equipment installations shall conform to the requirements of MIL-I-8672(Aer) unless otherwise specified.

3.4.4 Smoke Screen - All smoke screen equipment installations shall conform to the requirements of MIL-I-8674(Aer) unless otherwise specified.

3.4.5 Droppable Stores and Associated Release Systems - The installation of droppable stores and associated release systems shall conform to MIL-I-8671(Aer) unless otherwise specified.

3.5 Mounting Accessories - Supporting members, brackets, shelves, cable clamps, and other mounting accessories shall be installed as required to properly mount all components of the specified control system. Shock mounts and other special mounts required for certain equipments will be specified in Bureau of Aeronautics or Bureau of Ordnance publications. It shall be incumbent upon the contractor to determine if a component equipment requires shock mounting even though it has not been so specified in any of the Bureau of Aeronautics publications. Such shock mounts shall be contractor furnished. Permanently installed mounting accessories shall be drilled as required for each specification component. AN standard aluminum alloy machine screws with self-locking nuts shall be furnished at each mounting hole. Plate nuts, AN366, or other suitable approved equivalents and machine screws shall be provided where the under surfaces of the mounts are inaccessible. Clamps shall not be used for mounting the components. No components shall be mounted directly on the skin or the plexiglass of the aircraft.

3.6 Location of System Components - All system components shall be installed by the aircraft contractor and located in such manner to insure efficient operation of the system and will not be hampered by the characteristics of the installation. The location of such equipment shall have adequate accessibility as specified in paragraph 3.8. Location of all control system components shall be subject to approval of the Bureau of Aeronautics.

3.6.1 Location of Sight Unit - 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 the aircraft. In VF aircraft, the sight unit shall be mounted in the vertical center plane of the aircraft. With the operator's seat in the mean position, the line-of-sight of the sight unit (when properly aligned, see 3.13) shall be 30 in. \pm 1 in. above the center of the top of the seat surface (or top of the seat parachute pack if specified for the aircraft.) The "eye distance" shall be the fore and aft distance from sight head objective lens to the operator's eye. With the operator in the 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 within 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 eye(s). The "eye distance" for each sight unit installation in each type aircraft shall be approved by the Bureau of Aeronautics prior to cockpit construction. The sight unit must be properly located to present no obstruction to the operator's normal forward visibility including down vision and at the same time present no obstruction to the operator's view of the instrument panel while he is in the normal position for looking through the sight reflector plate. See requirement for alignment of sighting axis, 3.13.1.

3.7 Clearance - The following minimum clearances shall be provided in the installation of control systems:

3.7.1 Clearance for Government Installed Equipment - The contractor shall allow sufficient space for installation of Government installed equipment. Arrangement of mounting

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provisions and clearance for such equipment shall be such that special installation tools are not required. Clearance for removal and replacement of each equipment shall be provided. Clearance shall also be provided for disconnecting and connecting electrical connections to the equipments.

3.7.2 Displacement - The contractor shall determine the maximum displacement of each shock mounted component. The components will be installed in such a manner that the possibility of the component coming in contact with the airframe or other components except through the shock mounting is precluded.

3.7.3 Clearance for Adjustment - The contractor shall determine which components of a control system require normal daily adjustment. Such components shall be positioned in such a manner that the required adjusting tool can be placed in position for adjusting without interference from surrounding components or structures. For components which require less frequent adjustment, consideration should be given to a location which will afford the best accessibility for the most frequently adjusted components.

3.7.4 Operation Clearance - Adequate clearance for required manual operation shall be provided at each equipment which requires such operation during flight. Clearance shall be provided for convenient visibility of all operational controls which must be adjusted during flight.

3.7.5 Boresight Clearance - Clearance shall be provided for unobstructed sighting through the boresight fixtures to points beyond the forward end of the aircraft in any of the positions of adjustment of the sighting attachments throughout the required range. See 3.13.2.1.

3.8 Accessibility - Convenient access shall be provided for armament control system equipment as follows:

- (a) For ground inspection, checking and servicing of all control system equipment.
- (b) For adjustment during flight. (For the equipments which require such adjustment.)
- (c) For removal and installation of equipments for service and replacement.
- (d) For manual operation of each equipment which requires such operation during flight.

3.8.1 Access to Boresight - Access to the boresight fixtures shall be adequate to enable adjustment of the sighting attachments throughout the required range of adjustment with aircraft wings in any and all positions from flight position to fully folded. See 3.13.2.2.

3.9 Bonding - Bonding of the equipment shall be in accordance with MIL-B-5087.

3.10 Radio Interference - The radar and other electronic and electric components of the control system shall be installed such that the entire control system permits the completely equipped aircraft to conform to the requirements of Military Specification MIL-I-6051.

3.11 Cabling - The contractor shall be responsible for installing the proper inter-connecting cables as required for the operation of each component of the control system. AN standard electrical connectors shall be used for all connections unless direct connection to terminal blocks is required. Rosin core solder shall be used for splicing cables. Cable lengths shall be sufficient to permit disconnection for removal of equipment.

3.11.1 Moistureproofing of Cabling - Provisions shall be made to insure that moisture cannot enter the cables either by direct exposure or by condensation from humid atmospheric conditions. Approved moisture proof coatings shall be used; the coatings shall not interfere with proper electrical contact at connections.

3.11.2 Switches - All switches in the control system shall conform to the requirements specified in Military Specification MIL-I-8700.

3.11.3 Circuit Protection - Circuit protection external to the control system equipment shall be provided by the contractor in accordance with the circuit protection requirements as specified in Military Specification MIL-I-8700.

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3.12 Adjustments of the Control System Components - Each component of the control system shall be adjusted in accordance with specified requirements after the installation of the complete control system but prior to the adjustment of the over-all control system. (See 3.7.3)

3.13 Alignment - The following general requirements are applicable to the alignment of all types of control systems and the respective weapons for which they must operate: Detail requirements for the alignment of the particular system to be installed in each model aircraft will be contained in applicable Bureau of Aeronautics or Bureau of Ordnance drawings, specifications and/or other instructions.

3.13.1 Alignment of the Completed Control System Installation - After the installation of the control system components have been completed and required adjustments have been made, the over-all alignment of the system shall be made. The alignment of the system shall insure optimum accuracy of the aircraft operating as a weapons platform for tactical missions outlined in the aircraft design problem. Alignment of the over-all control system shall be in accordance with the requirements prescribed herein, and any additional requirements specified in applicable publications or directives. Alignment of all armament control systems shall be compatible with the applicable model aircraft. Alignment of the sighting axis shall be parallel to the alignment specified in 3.13.5 for guns.

3.13.2 Armament Datum Line - The armament datum line shall be used as the aerodynamic reference line for establishing the alignment of all weapons and related control equipment in the aircraft. The position of the armament datum line in the aircraft shall be located by boresight fixtures as required in 3.13.2.1. The armament datum line in each aircraft shall be that line which is parallel to the flight path of the aircraft under the following flight conditions:

- (a) Designed Maximum Speed
- (b) Unaccelerated Level Flight (1 g)
- (c) Full Military Power
- (d) Altitude as follows:
 - VF aircraft - 5,000 ft.
 - VA aircraft - 5,000 ft.
 - VP aircraft - 3,000 ft.
- (e) Combat Weight (60% fuel load and all required armament except as follows):

For VF type aircraft, drop-release type weapons shall not be considered as part of the combat weight for the purpose of determining the armament datum line.

3.13.2.1 Boresight Fixtures - The armament datum line (the basic sighting axis of the boresight fixtures) shall be located on each aircraft by two suitable lugs, bench marks, boresight instrument mounts or other accessible locating boresight fixtures. The two fixtures shall be separated by a minimum distance of 30 inches and shall be permanently installed. The fixtures shall be permanently labeled as the "ADL."

3.13.2.2 Boresighting Attachments - The boresighting fixtures shall be equipped with suitable sighting attachments. The sighting attachments may be detachable from, folding, or permanently attached to the locating boresight fixtures specified above. When adjusted to the sighting position, both front and rear sighting attachments must be sufficiently rigid to prevent deformation during normal service use. The rear sighting attachment shall have a movable peep on a graduated slide which is adjustable within a range sufficient to establish a sight line with a maximum error of 1 mil for aligning all required weapons as specified herein. The slide graduations shall be in mils; the zero adjustment shall be on the armament datum line and shall have a maximum uncertainty of 1 mil for repeated installations. The basic boresight for the guns and gun control equipment, the bombs and bomb control equipment, the rockets and rocket control equipment, and other weapons shall be indicated on the scale with a maximum uncertainty of 1 mil.

3.13.3 Required Armament Alignment Information - The following information shall be submitted to the Bureau of Aeronautics in accordance with Specification SR-6, see 3.15, as early as practicable for evaluation and approval and after approval shall be included in the Pilot's Handbook

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and/or the Handbook of Maintenance Instructions for the aircraft as required. See Military Specifications MIL-H-5473 and MIL-H-7700.

(a) Diagram showing position of the Armament Datum Line with respect to the following lines as applicable:

- (1) Fuselage reference line
- (2) Low mach number zero lift line
- (3) Fixed Sight Line
- (4) Thrust Line
- (5) Rocket launcher line for all types of rockets carried
- (6) Gun Line
- (7) Guided missile line (if carried)
- (8) Bomb Line
- (9) Centerline of radar (if installed)

(b) Flight conditions for which the ADL was established. See 3.13.2, giving quantitative values for V_{max} , military power, combat weight and altitude.

(c) Proposed position of alignment with respect to the ADL for all required weapons and related control equipment. Except for those weapons for which specific alignment is specified, the aircraft manufacturer shall determine the desired alignment of each required weapon and related control equipment or system based upon the requirements of 3.13.4 through 3.13.12 and requirements as specified in other publications pertinent to the particular weapon or equipment. An alignment proposal for each weapon station based on the above determination shall be submitted to the Bureau of Aeronautics prior to installation of the stations.

(d) Quantitative data showing the selected release conditions (i.e., speed, acceleration, power, weight and altitude, see 3.13.3.1) for each weapon if other than the ADL conditions are applied.

(e) Variation of the angle of incidence of the mounted weapon (aligned as recommended in (c) above throughout a range of flight conditions corresponding to the probable range of conditions under which the particular type of weapon will be released or fired in combat. This data will be studied by the Bureau of Aeronautics to evaluate the proposed alignment and also to evaluate the probable behavior of the weapons when released under flight conditions other than the alignment conditions.

(f) The range of adjustment for all guns and related control equipment.

(g) Attitude Data Charts. See 3.13.3.1.

(h) Boresight diagrams showing the airplane with the armament datum line parallel to the ground line in side and top views, the sighting fixtures, the sight line, the control system reference axis, the armament datum line, and the bore centerline of each gun barrel; all of these lines projected to the boresighting target. Further, it shall show complete range of boresighting adjustment of the guns. There shall be diagrams of the boresight targets at 1000 in. \pm 1 in. and at the minimum converging distance of the gun bore centerlines and the sight line projected (300 yards) see 3.13.5. These target diagrams shall show the sighting centers of the boresighting fixtures, the gun sight and each gun. The targets shall have a horizontal reference line. The armament datum line of the airplane projected shall pass through the horizontal reference line of the boresight target. Sighting points shall be located on the boresight charts for checking the alignment of the external rocket, torpedo and bomb stations on the aircraft with the target located at the 1000 inch gun boresighting range; if no fixed guns are mounted in the aircraft, the range shall be 1000 in. \pm 1 in. from the front lens of the sighting telescope when mounted on the foremost station. (For aircraft turret systems, suitable diagrams shall be furnished showing top view of the

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aircraft and boresight target arrangements for alignment of turret guns and sighting systems at 1000 inches \pm 1 inch from the front trunnion of the guns or other accessible measuring point on the guns. All boresight dimensions shall be shown in inches as two or three place decimals. The measuring point on the guns and sighting systems shall be noted on the boresight charts. See Figures 1 and 2 for typical boresight charts.)

(1) Boresighting instructions including alignment instructions for all armament required to be installed in the aircraft. Specific examples of the alignment procedure for each weapon and control equipment component shall be given beginning with the selection of the flight path for the optimum firing or release condition for the particular weapon or equipment.

3.13.3.1 Armament Datum Line Attitude Data Charts - The contractor shall prepare one chart showing the angle-of-attack (in mils) of the armament datum line for calibrated air speeds from 100 knots to maximum speed at gross weights ranging from fifty per cent of the maximum gross weight to maximum gross weight and correlated "g load" curves for cruising conditions and diving conditions. Information for diving conditions will not be required for VP aircraft. For examples of typical charts, see Figure 3. The chart will be used for determining and evaluating the alignment of all weapons and related control equipment with respect to the armament datum line in accordance with anticipated combat tactics for each particular weapon. The charts shall be submitted to the Bureau of Aeronautics in conjunction with the submittal of contractor's proposal for alignment of the weapons and control systems. The attitude data chart shall be of the form shown in this specification. It shall be of such size that maximum uncertainty in determining angle of attack of the armament datum line shall be less than two (2) mils. If the aircraft is equipped with speed or dive brakes, two such charts shall be submitted; one for the aircraft with speed brakes closed, and the other with speed brakes open. In addition to submitting these charts to the Bureau of Aeronautics, they shall also be published in the Handbook of Maintenance Instructions for the aircraft. Since the above charts, together with the information furnished in accordance with 3.13.3(a) are used for the preparation of sighting tables, it is essential that this information be submitted to the Bureau of Aeronautics as soon as it is available.

3.13.4 Weapon Alignment - If more than one type of weapon is to be carried on the same station on the aircraft, the major weapon (based on tactical requirements and designated by the Bureau of Aeronautics) shall determine the alignment of the station. If rockets are one of the types of weapons to be carried on a multi-weapon station, the alignment requirements for the rockets shall determine the alignment of the station unless otherwise specified.

3.13.5 Alignment of Fixed Guns and Their Control Systems -

(a) Yaw plane alignment: The guns in fuselage installations and all gun control system installations shall provide for alignment parallel to the armament datum line in the yaw plane. In addition to the above requirement, wing gun installations shall provide for alignment of the guns in the yaw plane to converge as follows:

- (1) VP Aircraft - 500 yds, \pm 2 feet from front trunnion.
- (2) VP and VA Aircraft - 600 yds, \pm 2 feet from front gun trunnion.

(b) Pitch plane alignment:

(1) VP Aircraft - All fixed guns and the gun control system shall be installed such that in their mean boresight alignment in the pitch plane shall be $1\frac{1}{2}^\circ$ above the principal or roll axis of the aircraft. Unless specific deviation is granted, the guns and gun control system installation shall be adjustable to provide for alignment of $1\frac{1}{2}^\circ$ above or 2° below to the principal or roll axis of the aircraft. 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.

(2) VA Aircraft - The fixed guns and the gun control system shall be installed with provisions for an adjustment range as specified for VP aircraft. 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 armament datum line prior to delivery.

3.13.6 Alignment of Flexible Weapon Systems and Related Control Equipment - The alignment of flexible weapon systems and related control equipment shall be in accordance with MIL-I-8673(Aer) and applicable alignment requirements noted herein.

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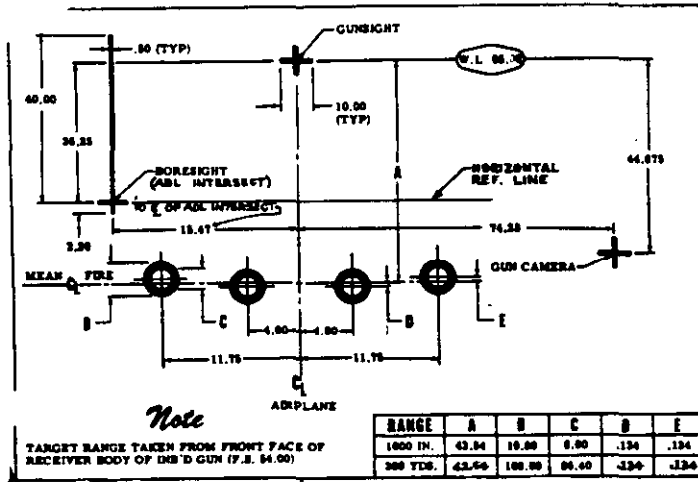


Figure 1. Typical Bombsight Chart for Aircraft with Fixed Nose Guns Only

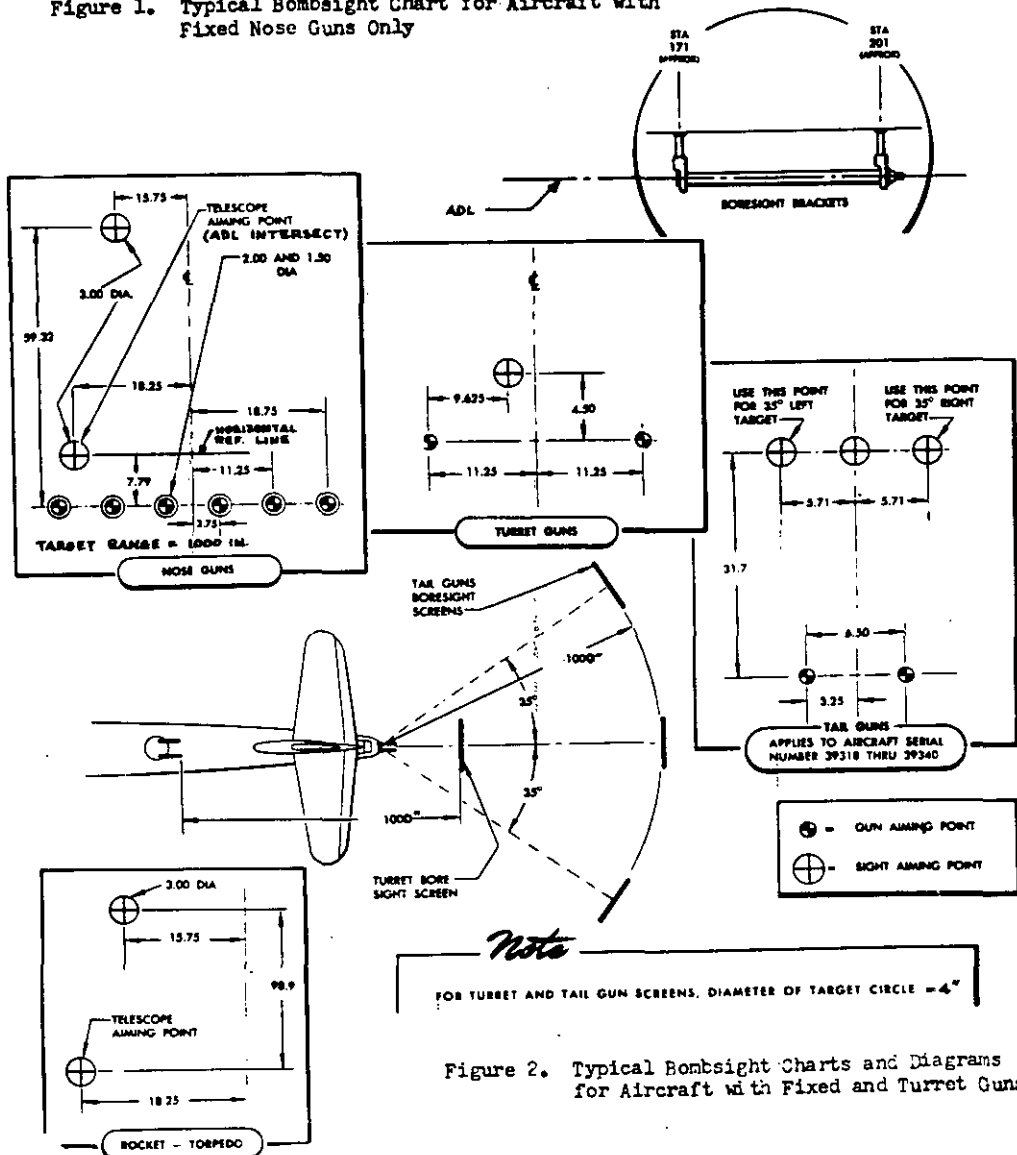
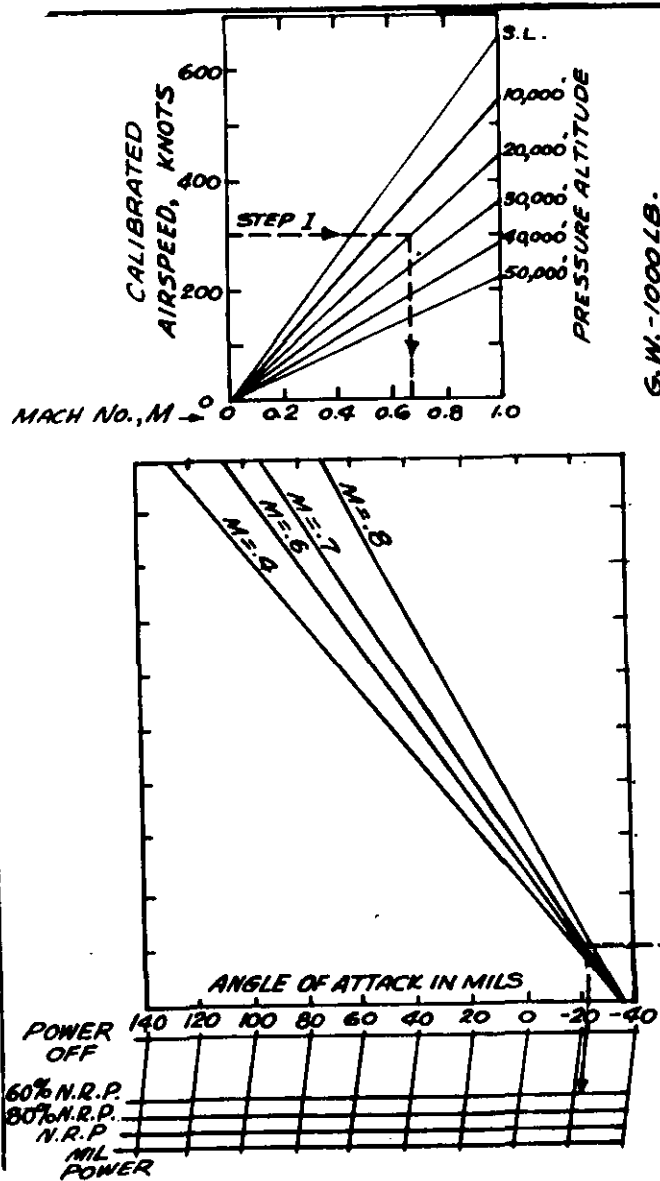


Figure 2. Typical Bombsight Charts and Diagrams for Aircraft with Fixed and Turret Guns

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G.W. - 1000 LB.

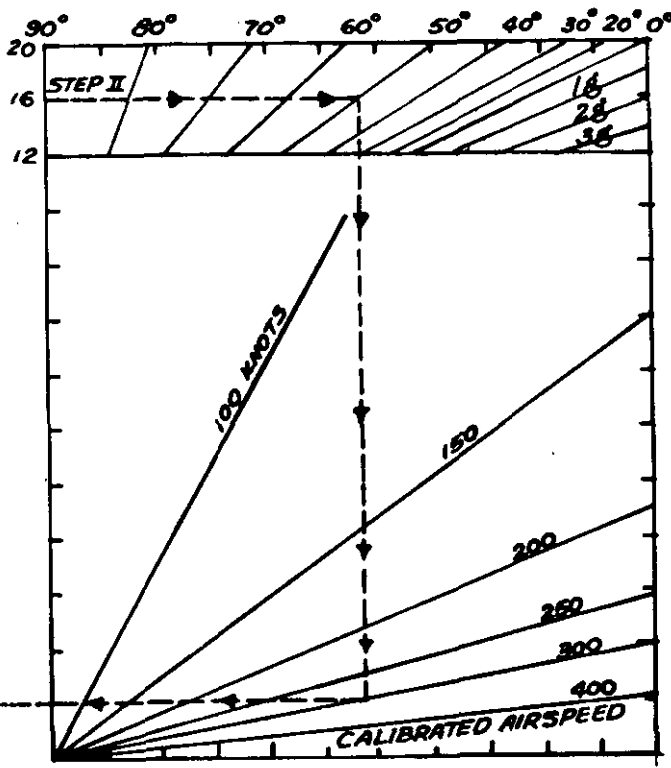


Figure 3. Angle of Attack Relationships

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3.13.7 Alignment of Rocket and Rocket Control Systems - Rocket launchers shall be installed in the aircraft such that the longitudinal axes of the rocket are aligned in the pitch plane parallel to the flight path of the aircraft for the average cruise condition to the target or to minimize the drag caused by carrying the rockets, unless flight conditions other than these are required for the operation of the rocket control system or the release of the rockets. The release conditions for rockets will be dependent upon the aircraft combat maneuvers required for the proper operation of the rocket control system. The installation and operation requirements for the specified control system must be determined in each case. Rockets shall be aligned within $\pm 0.25^\circ$ of the required alignment. Rockets designed for air-to-air firing shall be aligned within five (5) mils of the required alignment.

3.13.8 Alignment of Stores - Store suspension equipment shall be installed in the aircraft so that the longitudinal axes of the stores are aligned in the pitch plane parallel to the flight path of the aircraft for the average cruise condition to the target or to minimize the drag caused by carrying the stores, unless other alignment is required for the release of the stores.

3.13.9 Alignment of Bombs and Torpedo Control Equipment - The control equipment for bombs and torpedoes shall be installed in the aircraft such that the reference axis of the equipment is aligned parallel to flight path of the aircraft under the flight conditions selected for the alignment of the respective bombs or torpedoes.

3.13.10 Alignment of Special Control Equipment - Equipment such as tracking radar shall be aligned with its reference axis parallel to the reference axis of the control system with which it is used unless a definite alignment is specified for the special equipment. The installation and operation instructions for the particular equipment shall be consulted for pertinent alignment data. Additional requirements for alignment of such equipment may be determined from prototype tests. See 3.13.1.

3.14 Provision for Environmental Conditions - The control systems shall be installed to operate satisfactorily within the temperature ranges from -70°F to $\pm 160^\circ\text{F}$ and the humidity ranges encountered within this temperature range. Provisions to insure the above required operation shall be installed by the contractor as necessary.

3.15 Required Data and Drawings - Design data and drawings pertinent to the installation of control systems shall be submitted as early as possible in accordance with the requirements of Bureau of Aeronautics Specification, SR-6, "Contract Design Data Requirements for Aircraft and Aircraft Parts." See 3.13.3.

3.16 Weight - The total weight of the armament control system installations shall be a minimum consistent with strength and material requirements; in the design and construction of mounting brackets, and carry-through structural members, the contractor shall endeavor to reduce weight wherever practicable.

3.17 Workmanship - The workmanship throughout the installation shall be in accordance with high-grade aircraft instrument and electronics construction and installation practice. In all respects, the workmanship shall be acceptable to the Bureau of Aeronautics.

4. INSPECTION AND TEST PROCEDURES

4.1 The following inspections, tests, and demonstrations shall be conducted on fixed gun installations in naval aircraft. Additional special inspections, tests and/or demonstrations may be specifically required for certain aircraft, these will be specified in the applicable Aircraft Detail Specification or other Bureau of Aeronautics requirements.

4.2 Inspection of Drawings - All drawings required, in accordance with SR-6, under "Armament" will be examined by the Bureau of Aeronautics to determine compliance with the requirements of this specification.

4.3 Bureau of Aeronautics Inspection - Authorized Bureau of Aeronautics personnel will inspect the control system installation during construction. Approval of the installation in process will in no way constitute approval of final delivered installation. Final approval shall be subject to satisfactory demonstration of the specific installation.

4.4 Circuit Tests - All voltage tests and other circuit tests required in applicable Bureau of Aeronautics specifications or other publications specifically applicable to the particular

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control system(s) shall be conducted by the contractor prior to the demonstrations required in 4.6.

4.5 Control System Installation Check-Out - The contractor shall conduct operational checks on each aircraft to insure satisfactoriness of the following items in the control system installations prior to delivery of the aircraft: The aircraft shall remain on the ground during these checks. This check-out shall be made in conjunction with the check-outs made on the gun, rocket, droppable store and flexible weapon systems installations in the aircraft as required in the applicable installation specifications. (See paragraph 3.4.)

(a) Adequacy of all mechanical fastenings and all hydraulic, pneumatic and electrical connections in the respective circuits of the control system.

(b) Functioning of power source.

(c) Functioning of all electrical circuits up to release and or firing mechanisms.

(d) Functioning of all switches and guards in the circuits.

(e) Functioning of all safety devices.

(f) Functioning of all manual controls.

(g) Adjustment of all components which are required to be adjustable during flight.

(h) Accuracy of boresight alignment of all guns and gun sighting systems and alignment of all other weapons and the control systems as required herein.

(i) Adequacy of clearance and accessibility see paragraphs 3.7 and 3.9.

4.6 Demonstrations - If demonstration of armament is required for the applicable aircraft, the contractor shall demonstrate compliance with this specification in conjunction with the armament demonstrations required in the Bureau of Aeronautics Specification SR-38.

4.7 Test of Rocket Launchers - If the applicable Aircraft Detail Specification or other contractual instrument requires contractor furnished aircraft rocket launchers, then such rocket launchers shall be tested in accordance with Specification MIL-T-8676(Aer) unless otherwise specified.

5. PREPARATION FOR DELIVERY

5.1 The control system(s) in the aircraft shall be properly adjusted and serviced prior to delivery.

6. NOTES

6.1 Application - The requirements in this specification are pertinent to the installation of armament control systems and equipments in all types of naval aircraft and shall be applicable to any particular model aircraft, if conformance to this specification is required by the applicable Aircraft Detail Specification.

6.1.1 Modification - Modification and/or amplification of the requirements of this specification as applicable to a particular model aircraft, will be incorporated in the Aircraft Detail Specification at the time of its preparation. Modification and/or amplification of these requirements becoming necessary subsequent to the effective date of the applicable aircraft contract shall be accomplished in accordance with established Bureau of Aeronautics change procedure. Requests for modification shall be submitted in writing and shall include complete description, supporting data and reasons for modification.

6.1.2 Waivers - Requirements of this specification may be waived for specific applications upon presentation of substantiating data to and with approval from the Bureau of Aeronautics.

6.2 Furnished Data - Available specifications, drawings and other data required for the installation of government furnished equipment will be supplied to the contractor by the Bureau of Aeronautics upon request.

NOTICE - When Government drawings, specifications or other data are furnished to manufacturers or others for any purpose other than in connection with a definitely related Government

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procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications or other data, is not to be regarded by implication or otherwise in any manner as licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.