CHAPTER 15

AIRCRAFT WEAPONS SYSTEMS

Strike fighter and attack aircraft engage their targets automatically and accurately. These aircraft are designed and built as a complete integrated weapons system. The weapons subsystems are interconnected and dependent on each other or on other aircraft systems. For example, the bomb release system in some modes of operation depends on the aircraft's flight control system; the missile system is interconnected with the aircraft's radio detecting and ranging (radar) system for missile guidance. In addition to delivering weapons more accurately, computer-controlled weapons systems provide a higher degree of safety by reducing human error.

The Navy currently uses the fighter/attack (F/A)-18 aircraft, electronic attack (E/A)-18 aircraft, as well as the patrol (P)-3, P-8, aircraft and mine countermeasure helicopter (MH)-60 aircraft antisubmarine warfare weapons systems. The weapons systems used in modern aircraft are complex. The information on fighter, attack, and antisubmarine warfare weapons systems in this chapter is basic. As you work in your rating, you will learn more about specific systems, and you will be trained in their operation.

LEARNING OBJECTIVES

When you have completed this chapter, you will be able to do the following:

1. Identify fighter/attack aircraft weapons systems.
2. Identify antisubmarine warfare weapons systems to include the basic system, the kill store system, the release and control system, the release and control systems checks, and weapons system maintenance.
3. Recognize the safety precautions to follow while handling aircraft weapons systems.

FIGHTER/ATTACK AIRCRAFT WEAPONS SYSTEMS

The following text discusses the F/A-18 aircraft. It introduces information on the available aircraft armament systems, basic controls, and components common to these systems.

F/A-18A/B/C/D AIRCRAFT

The F/A-18A/B/C/D aircraft is a dual-role (fighter/bomber) and supersonic aircraft. External electrical power can be applied at the external power receptacle on the left side of the forward fuselage. This is easily accessible from the deck level. The external power connector connects 115-volt, three-phase, 400-hertz alternating current (ac) external power to the ac bus. When external power is not available, the aircraft has an auxiliary power unit (APU) to drive either of the aircraft generators for functional checkout of the aircraft system.

Aircraft Armament Systems

The systems and subsystems of the F/A-18A/B/C/D aircraft armament system are discussed in the following text. The aircraft armament system, basic controls, and components all function in relation to each other to release weapons/stores or fire rockets and missiles.

15-1
Air-to-Air Missile Control Systems

The air-to-air (A/A) missile control systems provide for the ability to select and launch air-launched, aerial intercept guided missile (AIM), including AIM-7 Sparrow, AIM-9 Sidewinder, and AIM-120 Advanced Medium-Range Air-To-Air Missile (AMRAAM).

- A/A weapon select switches are located on the pilot cockpit control stick and aft cockpit control sticks (in trainer-configured F/A-18B/D aircraft) (Figure 15-1); the A/A weapon select switch is a four-position switch used to select A/A weapons and configure the right digital display indicator (DDI) to the radar attack display; the forward position selects the AIM-7 Sparrow, pressing the switch down selects the AIM-9 Sidewinder, pressing the switch to the right selects the AIM-120 AMRAAM, and pressing the switch aft selects the guns
  - A/A missiles are selected with the A/A weapon select switch; at that time, all A/A launchers are unlocked and the right DDI is commanded to the radar attack display; provided the selected weapon is ready (MASTER ARM, AIM-7 tuned, AIM-9 cooled), the priority weapon is launched when the A/A missile trigger switch is actuated to the second detent
- A/A missile trigger switch is located on the pilot’s control stick (Figure 15-1), the A/A missile trigger switch is a two-position switch; the first detent initiates actuation of the head-up display (HUD) camera; the second detent initiates the firing of the gun

Figure 15-1 — Armament system basic controls.
• Infrared (IR) COOL switch is located on the MAP GAIN control panel (*Figure 15-2*) on the pilot’s instrument panel; the IR COOL switch is a three-position switch that controls cooling to AIM-9 Sidewinder seeker heads.

![](image)

*Figure 15-2 — Pilot cockpit A/A missile control system.*

• OFF position disables coolant to the seeker heads unless weight is off wheels; MASTER switch is in the ARM position, and a station is selected; the NORM position applies coolant to all seeker heads when weight is off wheels; the ORIDE position applies coolant to all seeker heads when power is applied to the aircraft.

• Weapon (WPN) volume control is located on the intercommunication amplifier-control on the pilot’s left-hand console (*Figure 15-2*), and the volume control panel on the aft cockpit left-hand console (*Figure 15-3*), the weapon volume control switch controls AIM-9 Sidewinder tone volume.

• Radar control switch is located on the sensor (SNSR) control panel on the pilot’s right-hand console, the radar switch controls power to the radar system; the radar system is used to control AIM-7 Sparrow and AIM-120 AMRAAM missiles.
Air-to-Ground Weapon Control Systems

The air-to-ground (A/G) weapon control systems provide for the ability to select, launch, fire, or release air-launched, surface attack missile (AGM), including AGM-65 Maverick, AGM-84 Harpoon/Standoff Land Attack Missile-Expanded Response (SLAM-ER), AGM-88 High-Speed Anti-Radiation Missile (HARM) or Advanced Anti-Radiation Guided Missile (AARGM), AGM-154 Joint Stand-Off Weapon (JSOW), bombs, and rockets. The A/G weapon control system consists of the components described in previous paragraphs which are common to all of the armament subsystems.

The following paragraphs describe additional controls and indicators of the A/G weapon control system.

- CAGE/UNCAGE switch is located on the pilot cockpit right throttle grip and aft cockpit right throttle grip (in trainer-configured F/A-18B/D aircraft) (Figure 15-4), cages and uncages the selected seeker or designates the selected HARM or AARGM target
- Sensor control switch is located on the pilot cockpit control grip and aft cockpit control grip (in trainer-configured F/A-18B/D aircraft), and on the left- and right-hand controllers in the aft cockpit in F/A-18D night attack aircraft (Figure 15-4), the sensor control switch is used to assign the target designator control (TDC) switch to the HUD or DDI
- A/G weapon release switch is located on the pilot cockpit control grip and aft cockpit control grip (in trainer-configured F/A-18B/D aircraft) (Figure 15-4), the A/G weapon release switch,
bomb button, or pickle switch initiates launch, fire, or release of selected A/G weapons; the aft cockpit A/G weapon release switch is inoperative

- RAID/Forward-Looking infrared (FLIR) switch is located on the pilot cockpit left throttle grip and aft cockpit left throttle grip (in trainer-configured F/A-18B/D aircraft) (Figure 15-4), the RAID/FLIR switch sequences between HARM targets

- TDC switch is located on the pilot cockpit right throttle and aft cockpit right throttle grip (in trainer-configured F/A-18B/D aircraft), and on the left- and right-hand controllers in the aft cockpit in F/A-18D night attack aircraft (Figure 15-5), the TDC switch slews the weapon video crosshairs over the target

- Multifunction switch is located on the left- and right-hand controllers in the aft cockpit on F/A-18D night attack aircraft, the multifunction switch is a three-position switch used for weapon control (Figure 15-5)
The forward position sequences between HARM target; the aft position cages and uncages the selected seeker; the down position functions as the RAID/FLIR switch.

- Electronic equipment control or up front control (UFC) (Figure 15-6) is located on the pilot and aft cockpit instrument panel, the UFC enables pilot interface with the mission computer (MC) system for selection of weapon moding and release parameters.

- Electrical fuzing system is located in the left fuselage panel on non-stores management upgrade (SMUG) aircraft and internal to the armament computer in SMUG aircraft, the electrical fuzing system provides the means to arm electrically-fuzed A/G weapons; the electrical fuzing system supplies selected (VT, INST, DLY 1, or DLY 2) fuzing voltage to electrically-fuzed bombs at weapon release (when bomb rack hooks open)

- AN/AWW-4A(V) fuze function control system is located in the left fuselage panel on Non-SMUG aircraft and internal to the armament computer in SMUG aircraft, the electrical fuzing system provides the means to arm electrically-fuzed A/G weapons; the electrical fuzing system supplies selected (VT, INST, DLY 1, or DLY 2) fuzing voltage to electrically fuzed bombs at weapon release; when release is initiated, voltage will be supplied through an interconnecting cable to the weapon during the first few inches of fall of the weapon.

Figure 15-5 — A/G weapon control system.

- The forward position sequences between HARM target; the aft position cages and uncages the selected seeker; the down position functions as the RAID/FLIR switch.
M61A1/A2 20 Millimeter Gun System

The M61A1/A2 20 millimeter (mm) gun system gives an aircraft the capability to fire this gun. The system enables selecting, arming, and firing. Depending on the mission objective, the gun can be operated in the A/A or A/G computer mode. No voltage is supplied to fire the gun until the trigger switch is pulled and all landing gear is up and locked.

Stores Management System

The stores management system (SMS) provides the interface, control, and release functions of the aircraft weapon stations and gun system. Two different SMS configurations exist: SMUG (F/A-18C/D aircraft, 165207 and up) and baseline, or Non-SMUG (F/A-18A/A+/B/C/D 161353 through 165206). The SMS consists of various components and will be discussed in the following section.

Armament System Basic Controls

The F/A-18A/B/C/D aircraft contain the following armament system basic controls (Figure 15-7) and components.

Armament Computer

Located in the right fuselage panel, the armament computer is a digital computer that interfaces with and is controlled by the MCs. The armament computer also interfaces with the weapon station command signal encoder-decoders (Non-SMUG) or signal data converter-controllers (SMUG). The armament computer contains a weapon insertion panel (WIP) for entering weapon and fuzing codes. On Non-SMUG computers, the WIP codes are entered by rotating the ARMAMENT and FUZING code switches. On SMUG computers, the WIP CODEs for station (STA) and nose or tail (NT) fuzing are entered with the WIP pushbutton switches.
Mission Computers
Located in the left and right fuselage panels, mission computers 1 and 2, respectively, are two digital data computers that make up the MC system and control the avionics systems (Figure 15-7). They interface with the armament computer and allow the armament computer to route power to the encoder/decoders for weapon release.

Armament Override Switch
Located in the nose wheel well, the armament safety override switch in the OVERRIDE position provides a parallel path for master arm power for ground operations (Figure 15-8).

Landing Gear Control Panel
Located on the pilot’s lower left instrument panel, the landing gear control handle in the DOWN position disables normal weapon release, launch, and fire signals. In the UP position, 28 volts direct current (dc) is directed from the main landing gear weight-off-wheels (WOW) relay to the master arm circuit breaker.
Pilot Cockpit Armament System Controls and Indicators

Additional armament system basic controls located in the pilot cockpit are described in the following paragraphs.

Ground Power Control Panel

The ground (GND) power (PWR) control panel is located on the pilot’s left-hand console (Figure 15-9), the GND PWR control panel controls power to the aircraft and systems. The panel contains five three-position switches. The EXT PWR switch controls application of external power to the aircraft. The OFF position disables electrical power; the RESET position resets the external power monitoring circuits; and the NORM, or normal, position allows external power to be supplied to the aircraft after placing the switch to RESET.

The 1, 2, 3, and 4 switches control application of power to aircraft systems preventing excessive equipment operating time because of other unassociated ground operations. The A and B ON positions apply power to selected systems; the AUTO position disables power to selected systems. Placing the EXT PWR switch to the OFF position returns all power control switches to AUTO.
Mission Computer/Hydraulic Isolation Panel
The MC/hydraulic (HYD) isolation (ISOL) panel is located on the pilot’s left-hand console (Figure 15-9), the MC/HYD ISOL panel contains the MC switch. The MC switch is a three-position switch that controls power to the mission computers. The 1 OFF position disables MC1; the NORM, position enables both MC 1 and 2; and the 2 OFF position disables MC2.

Digital Display Indicator
The DDI is located on the pilot’s instrument panel (Figure 15-9). The DDI allows for pilot interface with and display from the SMS and MC systems. The DDI displays the SMS wingform, which displays weapon type, quantity, priority, and status. The DDI controls also provide selected weapon video and a means for weapon selection and moding, and control and display of BIT functionality. The DDI
controls consist of the OFF, NIGHT, DAY, and AUTO switches used to apply power to the DDI under various lighting conditions; BRT switch to vary brightness of the display; and CONT switch to vary contrast of the display. Twenty pushbutton switches around the face of the DDI allow for selection of weapon modes and options, based on selected weapon type.

**Head-Up Display**

The HUD (Figure 15-9) is located on the pilot’s instrument panel. The HUD allows for weapon displays. The OFF/BRT switch controls power and brightness of the HUD display.

**Master Arm Control Panel**

The master arm control panel (Figure 15-9) is located on the pilot’s instrument panel. The master arm control panel allows for arming the armament systems, selecting A/A and A/G master modes, and emergency jettison of weapons and stores.

The MASTER switch is a two-position switch. ARM enables arming and SAFE inhibits releasing, launching, or firing of the aircraft armament systems.

The A/A switch is a pushbutton switch/indicator that selects A/A master mode. This mode allows for the selection, control, and launch of air intercept weapons and firing of the aircraft gun in A/A mode. Additionally, this mode commands the right DDI to display the A/A radar attack display.

The A/G switch is a pushbutton switch/indicator that allows for selection, control, launch, and fire of A/G weapons and the aircraft gun. Additionally, this mode commands the left DDI to display the stores wingform display.

**Aircraft Controller Grip**

The aircraft controller grip is located on the pilot’s control stick (Figure 15-10). The aircraft controller grip contains numerous switches for selection, launch, release, and fire of weapons in both A/A and A/G modes and actuation of the HUD camera.

Figure 15-10 — Cockpit armament system basic controls.
Engine Throttle Grips
The engine throttle grips are located on the pilot’s left-hand console (Figure 15-10). The left and right throttle grips contain numerous switches for control of weapons in both A/A and A/G modes and the dispensing of expendable payloads.

Aft Cockpit Armament System Controls and Indicators
Additional armament system basic controls located in the aft cockpit are described in the following paragraphs; refer to Figure 15-11 and Figure 15-12.

Digital Display Indicator
The DDIs (Figure 15-11) are located on the aft instrument panel and perform the same functionality as those in the pilot cockpit. On aircraft 161354 through 163778, the aft cockpit DDIs are connected in parallel with those in the pilot cockpit. On F/A-18D 163986 and up, the aft cockpit DDIs are independent displays.

Master Mode Select Panel/Rear Advisory and Threat Warning Panel
The master mode select panel/rear advisory and threat warning panel (Figure 15-11) is located on the aft cockpit instrument panel. The master mode select panel contains the A/A and A/G switches for F/A-18 161354 through 163778. The rear advisory and threat warning indicator panel assembly

Figure 15-11 — Rear cockpit armament system basic controls.
contains the A/A and A/G switches for F/A-18D 163986 and up. The master mode switches perform the same functionality as those in the pilot cockpit.

**Left- and Right-Hand Controllers**

The left- and right-hand controllers (*Figure 15-12*) are located in the aft cockpit on the left- and right-hand consoles (*Figure 15-6*). The controllers contain numerous switches for control of weapons in A/G mode and the dispensing of expendable payloads.

![Left and Right Hand Controllers](image)

*Figure 15-12 — Left- and right-hand controllers.*

**Jettison System**

The jettison system provides methods for jettisoning weapons and stores from the aircraft.

**Emergency Jettison**

Emergency jettison is a mode of jettisoning all weapons/stores from the five pylon stations. Conditions for jettison are weight-off-wheels or landing gear control handle in the UP position and the EMERG JETT PUSH TO JETT switch pressed.

The EMERG JETT PUSH TO JETT switch is located on the master arm control panel on the pilot’s instrument panel, the EMERG JETT panel on the aft cockpit instrument panel (F/A-18D trainer), or on the EMERG JETT panel on the aft cockpit left vertical control panel (F/A-18D night attack) (*Figure 15-13* and *Figure 15-14*), the emergency jettison switch initiates jettison from all pylon stations.
Selective Jettison

Selective jettison is a mode of individually jettisoning left fuselage missile, right fuselage missile, racks, launchers, and stores. Conditions for jettison are the landing gear control handle in the UP position, all gear up and locked, MASTER switch to ARM, stations selected by the JETT STATION SELECT switches, the SELECT JETT switch to the desired position, and the JETT pushbutton pressed.

- JETT STATION SELECT switches are located on the pilot’s instrument panel, the JETT STATION SELECT switches are five pushbutton switches/indicators that correspond to the aircraft left outboard (LO), left inboard (LI), centerline (CTR), right inboard (RI), and right outboard (RO) pylon stations and are used to select the stations for selective jettison or auxiliary release

- SELECT JETT switch is located on the pilot’s left vertical control panel, the SELECT JETT switch is a five-position switch used to select the station or type of jettison to be accomplished; the SAFE position inhibits all select jettison functions; the L FUS MSL and R FUS MSL, or left

Figure 15-13 — Pilot cockpit jettison system.
and right fuselage missile position, selects the respective fuselage station for selective jettison; the RACK/LCHR position selects weapons and stores on bomb rack unit (BRU)-32s for selective jettison; the STORES position selects weapons (on vertical ejection racks (VERs), BRU-32, BRU-41, and BRU-42), Maverick launcher and weapon, A/A launcher and weapon, drop tanks and data pods on BRU-32s for selected jettison with the exception of HARM, which is fired off unguided.

- The SELECT JETT, JETT switch is located in the center of the SELECT JETT switch, the select jettison switch initiates selective jettison or auxiliary release of selected stations.

Auxiliary Release

Auxiliary release is a gravity mode of jettison used on the five pylon stations when emergency and selective jettison fails. Conditions for auxiliary release are a hung weapon, the landing gear handle in the UP position, all gear up and locked, MASTER switch to ARM, stations selected by the JETT STATION SELECT switches, SELECT JETT switch to RACK/LCHR, AUX REL switch to ENABLE, and the SELECT JETT, JETT switch pressed.

The AUX REL switch is located in the pilot’s cockpit on the electronic countermeasures/infrared countermeasures control panel. The auxiliary release switch is a two-position switch used to enable...
or inhibit auxiliary release. The ENABLE position enables auxiliary release. The NORM position inhibits auxiliary release.

### Suspension and Accessory Equipment

The following data is intended to provide ordnance personnel with a brief description of suspension and accessory equipment specifically used with the F/A-18A/B/C/D aircraft.

#### Fuselage Centerline Pylon

The suspension underwing unit (SUU)-62 fuselage centerline pylons provide the necessary mechanical and electrical interface between the aircraft fuselage and the stores to be carried. The BRU-32 bomb rack is contained internally and provides pylon/weapon interface.

#### Wing Pylon

The SUU-63 wing pylons provide the necessary mechanical and electrical interface between the aircraft wing structure and the stores to be carried. It is capable of being installed at any of the wing stations. The BRU-32 bomb rack is contained internally and provides the pylon/weapon interface.

#### Bomb Ejector Rack

The F/A-18A/B/C/D aircraft utilizes the BRU-32 bomb ejector racks as the parent rack. The BRU-32 is used to suspend single weapons/stores, BRU-33s, BRU-41s, BRU-42s, BRU-55s, and launcher unit (LAU)-115, LAU-117, and LAU-118 missile launchers using 14- and 30-inch suspension hooks. Features of the bomb rack are safety interlock and automatic sway bracing. Sensing switches are incorporated to indicate to the armament computer that a store is loaded. The primary ejection unit uses two cartridges to generate the required gas pressure for rack operation. The auxiliary release unit uses one cartridge, which opens the hooks only, should primary ejection fail. Nose and tail arming units are provided for mechanical fuzes, and a receptacle is provided for connection of the electric fuze. There are also provisions for positive arming by use of positive arming latches.

#### Accessory Racks

Accessory racks are used to expand the capability of a weapon system, and include the following:

- **BRU-33A/A canted vertical ejector rack (CVER)** is used to suspend and release two weapons/stores and has 14-inch suspension hooks and is capable of carrying stores weighing up to 1,000 pounds each; store ejection is accomplished by two cartridge-generated gas pressure ejectors; the rack provides automatic sway bracing through the use of spring-loaded, self-adjusting wedges; the rack has zero-retention force (ZRF) arming units to allow for in-flight pilot release options, including provisions for positive arming by use of positive arming latches.

- **BRU-41 improved multiple ejector rack (IMER)** is designed to carry and release up to six weapons/stores; each ejector unit assembly is provided with a safety stop lever, arming units and positive arming latches; a cartridge-activated mechanism is used to provide for store ejection; the rack provides the necessary interface for store sensing, arming, and ejector breech firing; sway brace adapter brackets are used with small-diameter practice bombs (BDU-48, Mk 76, and BDU-59).

- **BRU-42 improved triple ejector rack (ITER)** is designed to carry and release up to three weapons/stores; each ejector unit assembly is provided with a safety stop lever located on the aft sway brace assembly.

- **BRU-55 bomb rack** provides a multiple carriage capability for A/G weapons and is attached to the BRU-32 bomb rack and has 14-inch suspension hooks and is capable of carrying two
stores ranging from 10 to 16 inches in diameter and weighing up to 1,000 pounds each; the BRU-55A/A variant carries either Aircraft/Store Electrical Interconnection System, Military Standard (MIL-STD)-1760 or non-MIL-STD-1760 stores; store ejection is accomplished by two cartridge-generated gas pressure ejectors; the rack provides automatic sway bracing through the use of spring-loaded, self-adjusting wedges; the BRU-55A/A allows for in-flight pilot options (e.g., low/high drag, primary/option mode); there are also provisions for positive arming by use of positive arming latches

Launchers

Launchers are used to carry or suspend self-propelled weapons. Most launchers serve to guide the self-propelled weapons on their first few inches of flight.

- LAU-7 series missile launcher is a rail-type missile launcher that carries and launches the AIM-9(series) (Sidewinder) missiles; the launcher also carries various instrumentation pods
- LAU-115 guided missile launcher is a rail-type missile launcher that carries and launches AIM-7(series) missiles; a jettison adapter is attached for improved jettison characteristics
- LAU-116 guided missile launcher is an ejector-type launcher for carrying and launching the AIM-120 missile on the fuselage stations 4 and 6
- LAU-117 guided missile launcher is a rail-type launcher for carrying and launching the AGM-65 missile
- LAU-118 guided missile launcher is a rail-type launcher for carrying and launching the AGM-88(series) missiles
- LAU-127 guided missile launcher is a rail-type launcher for carrying and launching the AIM-9(series) and AIM-120 missiles; the launcher also carries various instrumentation pods
- LAU-68(series) aircraft rocket launcher is a reusable launcher for carrying and launching seven 2.75 inch rockets in SINGLE or RIPPLE firing modes

AN/ALE-39 Countermeasures Dispensing System

The AN/ALE-39 countermeasures dispensing system dispenses decoys to confuse and jam enemy electronic tracking, missile guidance, and homing systems. The system ejects expendable payloads consisting of chaff, flares, or radiofrequency (RF) jammers singly or in groups from two 30-round dispenser magazines located on the lower fuselage under the engine intakes.

AN/ALE-47 Countermeasures Dispensing System

The AN/ALE-47 countermeasures dispensing system provides for threat-adaptive, reprogrammable computer-controlled dispenses of decoys to confuse and jam enemy electronic tracking, missile guidance, and homing systems. The system ejects expendable payloads consisting of chaff, flares, or RF jammers singly or in groups from four 30-round dispenser magazines located on the lower fuselage under the engine intakes.

Aircraft Armament Configuration Capabilities


The F/A-18A/B/C/D basic armament configuration can be reconfigured to accommodate a variety of weapons; Figure 15-15 shows the station configuration capabilities. The Navy Tactical Reference
Publication (NTRP) 3-22.4-FA18A-D should be consulted for authorization to load/fuze any weapon or store for flight.


**Figure 15-15 — F/A-18 aircraft station configuration capabilities.**

### F/A-18E/F AND EA-18G AIRCRAFT

The F/A-18E/F Super Hornet provides significant improvements in combat range, payload, and survivability in comparison to legacy F/A-18 aircraft. There is commonality of weapons systems, avionics, and software among F/A-18 variants. The following paragraphs will provide an overview of the aircraft armament system and will focus on the armament systems and subsystems of the F/A-18E/F Super Hornet.
Armament System Basic Controls

The aircraft armament system consists of controls, indicators, circuit breakers, systems, and subsystems necessary to release weapons/stores from the aircraft.

Armament Computer

The armament computer (Figure 15-16) interfaces with and is controlled by the MCs. The armament computer interfaces with and controls the weapon station signal data control converters; monitors and controls gun fire rates; and provides electric fuzeing voltage. The armament computer contains the digital WIP used to enter the weapon type and fuzeing requirements for each station loaded.

Figure 15-16 — Armament computer.

The weapon-type code entered for each loaded station must match the weapon loaded, and the nose/tail fuze code entered must be compatible. Otherwise, the armament computer will not allow it to release normally. For weapons without nose/tail fuzes, the codes in the armament computer must still match the weapon loaded. In addition, the quantity of rounds loaded in the M61 gun system is also entered using the WIP.

Armament System Circuit Breakers

The armament system circuit breakers are located on the power distribution panels behind the right- and left-hand maintenance access doors.

Landing Gear Control Panel

The landing gear control handle in the DOWN position disables normal weapon release, launch, and fire signals. In the UP position 28 volts dc is directed from the main landing gear weight-off-wheels relay to the master arm circuit breaker.
Armament Safety Override Switch

The armament safety override switch is on the nose wheel well maintenance panel. In the OVERRIDE position, it provides a parallel path for master arm power for ground operations.

Mission Computers

Two digital data computers (Figure 15-16) make up the MC system and control the avionics systems. They interface with the armament computer and allow power routing to signal data convertor controls for weapon release. Power to the digital data computers is controlled by the MC switch on the MC/HYD ISOL panel.

Signal Data Converter Control

The signal data converter control provides interface with the armament computer and weapons loaded. The seven pylon converter controllers are identical. The two fuselage converter controllers are identical and also provide interface to the wing tip launchers. The converter controllers provide release voltage and weapons/rack/launcher status to the armament computer.

Pilot Cockpit Armament System Controls and Indicators

Digital Display Indicators

Cockpit DDIs are located on the main instrument panel (left and right). DDIs are identical and display the same information, although not at the same time. The SMS uses the DDIs to display weapon, function, and option selection. The operator makes a selection on the DDIs by using the 20 pushbuttons around the edge of the display screen and by using the up front control display (UFCD) for quantity, multiple, and interval selection. Upon initiation of the stores display, number, station, master arm status, and type of weapons loaded are shown in the wingform display.

The wingform (Figure 15-17) is an outline of the aircraft that identifies type, station, number, and status of weapons loaded on the aircraft. A weapon is identified by entering a code on the armament computer WIP. Data is transmitted to the MC system, which displays the entered code as an acronym. The acronym is displayed in the wingform for the station in which the code was entered.

The operator makes a weapons selection for A/G weapons by pressing the pushbutton switch next to the acronym of the desired weapon. When this switch is pressed, a box appears around the weapon acronym, indicating that weapon is selected.

Up Front Control Display

The UFCD (Figure 15-18) is a touch-sensitive display that provides the keypad, option select, scratchpad, and option displays. The option select display allows selection of quantity (QTY), multiple (MULT), and interval (INT) options. After selecting an option, the operator uses the keypad option to
enter a number, which will be displayed on the scratchpad display. After verifying the number on the scratchpad display as correct, the operator presses the keypad option enter (ENT) to transmit the number to the MC system. The MC provides the data to the armament computer for storage and display on the DDIs.

Figure 15-18 — F/A-18E/F/G armament systems controls.
Head-Up Display
The HUD is located on the pilot’s main instrument panel, HUD allows for weapon displays and visual markers.

Master Arm Control Panel
The master arm control panel assembly (Figure 15-19) allows the operator to select the A/A, A/G, and MASTER modes. The panel also contains the emergency jettison (EMRG JETT) and push to jettison (PUSH TO JETT) switches.

Rear Cockpit Basic Control
An overview of the rear cockpit armament basic controls of the F/A-18F series aircraft is described in the following paragraphs.

Digital Display Indicators
The DDIs are located on the rear cockpit instrument panel (Figure 15-20). The rear DDIs provide independent displays but are also capable of providing the same display as the cockpit.

Rear Advisory and Threat Warning Indicator Panel
The rear advisory and threat warning indicator panel assembly contains the A/A and A/G switches, and on lot numbers 166449 and up, the MASTER ARM annunciator and LASER arm annunciator.

Figure 15-19 — Master arm control panel.
Figure 15-20 — F/A-18E/F/G rear cockpit armament systems controls.
Left- and Right-Hand Controllers

The rear left- and right-hand controllers (*Figure 15-21*) contain numerous switches for weapons control and on lot numbers 166449 and up, they contain selection, launch, and release of weapons.

![Diagram of F/A-18E/F/G left- and right-hand controllers.](Image)

*Figure 15-21 — F/A-18E/F/G left- and right-hand controllers.*

A/A Missile Control Systems

The A/A missile control systems provide the ability to select and launch A/A missiles including AIM-7, AIM-9, and AIM-120. Some of the A/A missile controls are located on the aircraft controller grip, as shown in *Figure 15-22*. The cockpit switches associated with the A/A weapons system are described in the following paragraphs.

A/A Weapon Select Switches

These switches are located on the cockpit controller grip assembly, rear cockpit controller grip assembly in trainer configuration; and on 166449 and up night attack configuration, the right-hand controller. The weapon select switch is a four-position switch used to select A/A weapons. The forward position selects the AIM-7; down selects the AIM-9; right selects the AIM-120; and aft selects the gun (*Figure 15-20*).
Cage/Uncage Switch

This switch is located on the cockpit right engine throttle grip—the rear cockpit right engine throttle grip in trainer configuration, and the right-hand controller on 166449 and up night attack configuration. The cage/uncage switch cages and uncages the selected AIM-9 seeker. On F/A-18F 165541 through 165934 night attack configuration, the A/A cage/uncage function is performed in the rear cockpit by the aft position of the multifunction switch.

A/A Missile Trigger Switch

This switch is located on the cockpit controller grip assembly and rear cockpit controller grip assembly in trainer configuration. The rear cockpit controller grip assembly A/A missile trigger switch is inoperative. The cockpit A/A missile trigger switch is a two-position switch. The first detent initiates the HUD camera and the second detent initiates A/A weapon launch.

A/A Weapon Release Switch

This switch is located on the right-hand controller on 166449 and up and is a single pushbutton switch used to initiate A/A missile launch.

IR COOL Switch

The IR COOL switch is located on the spin recovery control panel (Figure 15-18). It is a three-position switch that controls the flow of coolant/high pressure pure air to the AIM/CATM-9M seeker head. The OFF position disables flow unless the aircraft is weight-off-wheels, the MASTER switch is in the ARM position, and an AIM-9 station is selected. NORM enables flow to all seeker heads when weight-off-wheels. ORIDE enables flow when power is applied to the aircraft.

WPN Volume Control

The WPN volume control is located on the cockpit Intercommunication Amplifier-Control and rear cockpit volume control panel. This switch controls AIM-9 tone volume.

Radar Control Switch

The radar control switch is located on the SNSR pod control panel. The radar switch controls power to the radar system. The radar system controls the AIM-7 and AIM-120 missiles.

A/G Weapon Control System

The A/G weapon control system provides the ability to select, launch, fire, or release A/G missiles, bombs, and rockets. Some of the A/G weapons controls are on the left and right throttle grips, shown in Figure 15-23. Cockpit switches and displays used in the A/G weapons subsystem are described in the following sections.

Figure 15-22 — Aircraft controller grip.
Cage/Uncage Switch
This switch is located on the cockpit right engine throttle grip—rear cockpit right engine throttle grip in trainer configuration, and the right-hand controller on 166449 and up night attack configuration. The cage/uncage switch cages and uncages the selected Maverick seeker or initiates HARM functions.

On F/A-18F 165541 through 165934 night attack configuration, the A/G cage/uncage function is performed in the rear cockpit by the aft position of the multifunction switch.

Throttle Designator Control Switch
This TDC switch is located on the cockpit right engine throttle grip—rear cockpit right engine throttle grip in trainer configuration, and on the left- and right-hand controllers on F/A-18F 165541 through 165934 night attack configuration. The TDC switch slews the weapon video crosshairs over the target.

Designator Control Switch
The designator control (DC) switch is located on the right-hand controller on 166449 and up night attack configuration. The DC switch slews the weapon video crosshairs over the target.

HARM Sequence/FLIR FOV/RAID Switch
The HARM Sequence/FLIR FOV/RAID switch is located on the cockpit left engine throttle grip and on the rear cockpit left engine throttle grip in trainer configuration. The switch sequences between HARM targets. On F/A-18F 165541 through 165934 night attack configuration, the HARM target sequence function is performed in the rear cockpit by the forward position of the multifunction switch.

HARM Switch
On 166449 and up night attack configuration, the HARM target sequence is performed in the rear cockpit by the HARM switch, located on the right-hand controller (Figure 15-21).

Multifunction Switch
On F/A-18F 165541 through 165934 night attack configuration, the switch is located on the left- and right-hand controllers. The multifunction switch is a three-position switch used for weapon control. The forward position sequences between HARM targets. The aft position cages/uncages selected seekers. The down position functions as the RAID/FLIR switch.

A/G Weapon Release Switch
This switch is located on the cockpit controller grip assembly (Figure 15-22)—rear cockpit controller grip assembly in trainer configuration, and the left-hand controller on 166449 and up night attack configuration. The cockpit A/G weapon release switch/bomb button/pickle switch initiates launch, fire, or release of all selected A/G weapons. The rear cockpit controller grip assembly A/G weapon
release switch is inoperative. On 166449 and up night attack configuration, the left-hand controller A/G weapon release switch is a single pushbutton switch that is armament computer-controlled, with capability to release a limited type of A/G weapons.

Up Front Control Display
The UFCD is located on the cockpit and rear cockpit main instrument panel (Figure 15-18). The UFCD enables the quantity, multiple, and interval options for A/G weapons to be entered into the MCs.

Electrical fuzing System
The electrical fuzing system is located in the armament computer. The electrical fuzing system provides the voltage to arm electrically-fuzed A/G weapons. The system supplies the selected VT, INST, DLY 1, or DLY 2 voltage when the bomb rack hooks open for weapon release.

Jettison System
The jettison system provides a method of jettisoning weapons/stores from the aircraft. The following paragraphs describe controls and indicators of the jettison system.

Emergency Jettison
Emergency jettison is a mode of jettisoning all weapons/stores from the seven pylon stations. Conditions for emergency jettison are weight-off-wheels or landing gear control handle in the UP position and the EMERG JETT PUSH TO JETT switch (Figure 15-24) pressed.

The EMERG JETT PUSH TO JETT switch is located on the cockpit master arm control panel and rear cockpit EMERG JETT panel. The EMERG JETT PUSH TO JETT switch initiates jettison from all pylon stations.

Selective Jettison
Selective jettison is a mode of individually jettisoning left fuselage missile, right fuselage missile, racks, launchers, and stores. Conditions for selective jettison are the landing gear control handle in the UP position, all gear up and locked, MASTER switch to ARM, stations selected by the JETT STATION SELECT switches, SELECT JETT switch rotated to the position needed, and the JETT switch pressed.

- SELECT JETT switch is located on the cockpit left vertical control panel (Figure 15-18), the SELECT JETT switch is a five-position switch that is used to select the station or type of jettison needed; the SAFE position inhibits all select jettison functions; the L FUS MSL and R FUS MSL positions select the left/right fuselage missile station
- The RACK/LCHR position selects weapons and stores on the selected BRU-32 stations; the STORES position selects weapons (on BRU-33/55, BRU-41, BRU-42, and BRU-32), LAU-117 launcher with the AGM-65, LAU-115 launcher with A/A missiles, fuel tanks, and data pods on
the BRU-32 for selected jettison with the exception of AGM-88 HARM, which is launched armed and unguided

- The JETT STATION SELECT switches are located on the cockpit main instrument panel (Figure 15-17) and are seven pushbutton switch/indicators that correspond to the aircraft LO, LM, LI, CT, RI, RM, RO, used to select the pylon station for selective jettison or auxiliary release

- The SELECT JETT, JETT switch is located in the center of the SELECT JETT switch, the JETT switch initiates select jettison or auxiliary release of the selected stations

**Auxiliary Jettison**

Auxiliary release is a gravity mode of jettison used on selected pylon stations when emergency and selective jettison fails. Conditions for auxiliary release are a hung weapon, landing gear control handle in the UP position, all gear up and locked, MASTER switch to ARM, stations selected by the JETT STATION SELECT switches, SELECT JETT switch to RACK/LCHR, AUX REL switch to ENABLE, and the SELECT JETT, JETT switch pressed.

AUX REL switch is located on the cockpit electronic countermeasures (ECM) control panel. The AUX REL switch is a two-position switch used to enable or inhibit auxiliary release. The ENABLE position enables auxiliary release. The NORM position inhibits auxiliary release.

**Gun System Controls (F/A-18E/F)**

The gun system provides the means to select, arm, and fire the M61 gun in A/A and A/G modes. Firing voltage, rounds count, and rate of fire are all controlled by the armament computer.

**A/A Weapon Select Switch**

This switch is located on the cockpit controller grip assembly—rear cockpit controller grip assembly in trainer configuration and on the right-hand controller on 166449 and up night attack configuration. The weapon select switch (Figure 15-22) is a four-position switch used to select A/A weapons. On F/A-18E/F, the aft position selects the gun. On EA-18G, the aft position selects the ALQ-218 system.

Gun selection in A/G mode is made by selecting the GUN option on the wingform display. The GUN option will be selected (boxed) and rounds remaining will be displayed. If another A/G weapon has already been boxed and then GUN is selected, hot gun (gun fire available during A/G release) is enabled. When the MASTER switch is positioned to ARM and RDY is displayed, firing voltage is applied when the A/A missile trigger switch is positioned to the second detent.

Gun selection in the A/A mode is made from the aft position of the A/A weapon select switch. Selecting A/A gun commands the right DDI to the A/A radar attack display and selects the high rate of fire. When the MASTER switch is positioned to ARM and RDY is displayed, firing voltage is applied when the A/A missile trigger switch is positioned to the second detent.

**A/A Missile Trigger Switch**

This switch is located on the cockpit controller grip assembly and rear cockpit controller grip assembly in trainer configuration. The rear cockpit controller grip assembly A/A missile trigger switch is inoperative. The cockpit A/A missile trigger switch (Figure 15-22) is a two-position switch. The first detent initiates the HUD camera and the second detent initiates gun firing.
Integrated Defensive Electronic Countermeasures (IDECM) Dispensing Systems

IDECM dispensing systems include the AN/ALE-47 integrated countermeasures system and AN/ALE-50A integrated countermeasures system. Dependent on aircraft configuration, countermeasure systems contain numerous/different weapon replaceable assemblies.

AN/ALE-47 Dispensing System

The AN/ALE-47 system provides for threat adaptive, reprogrammed computer- or manual-controlled dispenses of decoys to confuse and jam enemy electronic tracking, missile guidance, and homing systems. The system ejects expendable payloads of chaff, flares, or RF jammers from four dispenser magazines located on the lower fuselage aft of the engine intakes.

AN/ALE-50A Dispensing System

The AN/ALE-50A system provides for reprogrammable, computer- or manual-controlled dispenses of an active RF transmitting towed decoy. The magazine with three decoys is installed in the lower fuselage between the main landing gear doors.

ECM Control Panel

Located on the cockpit center console, the ECM control panel contains the AN/ALE-47/50A system power switches. The DISPENSER switch ON position applies power to the AN/ALE-47 system. The BYPASS position allows for AN/ALE-47 degraded mode dispenses. The ECM JETT, JETT SEL switch is a pushbutton switch/indicator that enables jettison of all AN/ALE-47 payloads identified in the Mission Data File (MDF) as being jettisonable, typically flares and IR payloads. The DECOY/JAMMER switch ON position applies power to the AN/ALE-50A system. The CUT position is a backup sever command to cut the towed decoy line from the AN/ALE-50A magazine.

Aircraft Armament Configuration Capabilities

The basic armament configuration of the F/A-18E/F and EA-18G aircraft consists of fuselage-mounted LAU-116 missile launchers, wingtip-mounted LAU-127 missile launchers (F/A-18E/F), wingtip-mounted AN/ALQ-218 pods (EA-18G), SUU-78 centerline pylons, SUU-79 inboard/mid-board wing pylons, SUU-80 outboard wing low drag pylons (LDP), BRU-32 bomb racks, ADU-773 launcher adapters, and an M61A2 gun (F/A-18E/F) (Figure 15-25 and Figure 15-26).

The F/A-18E/F/G basic armament configuration can be reconfigured to accommodate a variety of weapons; Figure 15-27 shows the station configuration capabilities.

A general description of the F/A-18E/F and EA-18G aircraft armament systems and suspension or releasing equipment is contained in the Airborne Weapons/Stores Loading Manual, A1-F18EA-LWS-000. For specific weapons loading and flight authorization, refer to the NTRP 3-22.4-F/A-18E/F, NTRP 3-22.2-EA18G, or the flight clearance message.
Figure 15-25 — F/A-18E/F/G basic armament configuration.
Figure 15-26 — F/A-18E/F/G basic armament configuration.
Antisubmarine warfare (ASW) is becoming a broad field. New developments are being made in submarine detection as well as in the tactical deployment of the equipment. The search stores (primarily sonobuoys)—launched at precise intervals and locations (and with the airborne electronics equipment)—give accurate information in the detection of submarines. The kill stores consist of torpedoes, mines, bombs, rockets, and guided missiles. The basic ASW search and kill store system and its associated equipment are currently used in the P-3 and P-8 fixed-wing aircraft and the MH-60 rotary-wing aircraft.

Figure 15-27 — F/A-18E/F/G basic aircraft configuration.

ANTISUBMARINE WARFARE WEAPONS SYSTEMS

Antisubmarine warfare (ASW) is becoming a broad field. New developments are being made in submarine detection as well as in the tactical deployment of the equipment. The search stores (primarily sonobuoys)—launched at precise intervals and locations (and with the airborne electronics equipment)—give accurate information in the detection of submarines. The kill stores consist of torpedoes, mines, bombs, rockets, and guided missiles. The basic ASW search and kill store system and its associated equipment are currently used in the P-3 and P-8 fixed-wing aircraft and the MH-60 rotary-wing aircraft.
The P-3 is a four-engine, low-wing aircraft designed for patrol and ASW. The armament system consists of equipment for loading, carrying, and releasing weapons and search stores. Weapons include bombs, mines, torpedoes, missiles, and rocket launchers. Search stores include sonobuoys, parachute flares, smoke markers, bathythermograph buoys, and signal underwater sound (SUS).

**Armament Systems Basic controls**

The basic P-3 (Figure 15-28) ASW weapons system consists of the equipment and accessories necessary for carrying and releasing kill stores and search stores. Armament basic controls consist of the following components: pilot armament control panel, armament control box, weapons release switches, armament safety circuit disable switch, forward interconnection box, aft interconnection box, and armament circuit breaker panel.

**Figure 15-28 — P-3 ordnance stations.**

**Armament Control Box**

In all series of P-3 Orion aircraft, the pilot armament control panel, wing jettison, and special weapon armament panel have been replaced by an armament control box (ACB) (Figure 15-29). The ACB is located on the center pedestal at the flight station. The ACB combines the functionality of the two panels and provides the pilot with command control of all kill and search stores.

The switches and controls that are found on the armament control box are as follows:

- The ARM HAZARD warning light warns the pilot of a malfunction of any of the 18 weapon release buffer relays
- The MASTER ARM switch controls power for enabling arming and normal release of the wing and bomb bay stores
- The MASTER ARM cue light advises pilot to change the position of the MASTER ARM switch in response to action by the tactical coordinator (TACCO) or computer
- The BOMB BAY door switch controls opening and closing of the bomb bay doors
- The BOMB BAY cue light advises the pilot to change position of the BOMB BAY door switch in response to action by the TACCO or computer
• The search power (SRCH PWR) switch allows the pilot final control over the release of all search stores; the computer monitors the position of this switch

• The SRCH PWR cue light, when illuminated, tells the pilot to turn the SRCH PWR switch ON; it lights only when the switch must be moved from OFF to ON; there is no offline function of this light

• The KILL READY cue light advises the pilot that preparations are completed for release of the weapon/store

• The JETTISON switch initiates release of all wing and bomb bay weapons/stores in a safe (unarmed) condition

• The manual armament select (MANUAL ARMT SEL) panel provides the TACCO with controls necessary for manual mode of operation

Weapon Release Switches
Both the pilot and copilot have switches for the release of weapons (Figure 15-30). The switches are located on the inboard side of the control wheels and are labeled stores release (STORES REL). Weapon release can also be made by depressing the release (REL) switch located on the TACCO manual armament select panel.

Armament Subsystems
The following paragraphs provide general information on the aircraft armament subsystems to include torpedo, Harpoon, Maverick, jettison, and defensive countermeasure systems and subsystem components.

Torpedo System Basic Controls
The aircraft’s torpedo system consists of the following basic controls:

• The torpedo presetter (TORP Presetter) panel provides the controls and indicators for manual or automatic preset of Mk 46, Mk 50, and Mk 54 torpedoes

• Torpedo Mk 50 heater control panel provides selection of Mk 50 heater power

• DIRECTED SEARCH MODE selector panel (Figure 15-31) provides directed search capability for Mk 46, Mk 50, and Mk 54 torpedoes
Harpoon System Basic Controls

The Harpoon missile system basic controls are described below.

- The Harpoon aircraft command launch control (HACLC) panel provides power application, controls, and displays for the Harpoon missile; the controls and displays are used for manually defining missile selection/deselection, target range, relative bearing, attack seeker modes, aircraft true airspeed, and altitude inputs.

- The data processor computer is a general-purpose, stored program, digital computer that provides the digital communications link between the HACLC and the Harpoon missile; the data processor computer serves as an interface unit to obtain control and data information from existing aircraft systems; it performs the launch interlocks and prelaunch computations for missile initialization and control of the launch sequence.

Maverick Missile Control System Basic Controls

The Maverick missile control system (MMCS) provides the capability to individually identify and track up to four separate targets with missiles loaded on wing stations 10, 11, 16, and 17. The MMCS is composed of the following basic controls.

- The missile interface box is the heart of the MMCS and is the one component through which all signals used to control the MMCS are routed.

- The missile armament panel (Figure 15-32) provides the TACCO with the status of the MMCS and allows the TACCO to control various missile functions; the TACCO can select up to four missiles to enter the launch mode (land or ship), initiate missile cooling, and activate the missile.

- The missile/infrared detection set (IRDS) status panel provides missile and IRDS control status indicators.

- The missile controllers are two identical and interchangeable joysticks used to provide missile and IRDS turret controls to the missile interface box.

Jettison System

All kill stores on the aircraft will be jettisoned in an unarmed condition when the pilot places the JETTISON panel.
switch on the pilot armament control box in the ACTUATED position. The kill stores are jettisoned from the aircraft within a 20-second period. Components and functions of the jettison system are described below.

- WING ONLY JETTISON switch initiates jettison release of wing weapons/stores in a safe (unarmed) condition. The WING ONLY JETTISON switch is a separate guarded (JETTISON) switch located on the pilot armament control box.

- The jettison function can be terminated at any time before release by placing the JETTISON or WING ONLY JETTISON switch to the OFF position

**Defensive Countermeasures**

The AN/ALE-39 and AN/ALE-47 countermeasures dispensing systems and controls are described below.

- The AN/ALE-39 countermeasures dispensing system, in conjunction with the AN/AAR-47 missile warning set (MWS), is designed to protect the aircraft from infrared guided missiles; the countermeasures dispenser (CMD) system installed in this aircraft was designed to only dispense flare payloads
  - The CMD control panel is located at the base of the copilot overhead and provides the functional interface to the ALE-39 countermeasures dispensing system
  - The AN/ALE-39 CMD programmer is located at the TACCO console in the upper-right corner and generates control signals for programmed or single ejection of payload sequences controlled by the CMD control and initiated manually or automatically by the MWS

- The AN/ALE-47 countermeasures dispensing system, in conjunction with the AN/AAR-47 MWS, is designed to protect the P-3C anti-surface warfare improvement program (AIP) aircraft from surface-to-air and A/A missiles; the AN/ALE-47 system has the capability to automatically dispense a combination of chaff, flare, or jammer payloads. An example of the ALE-47 cockpit controls is shown in Figure 15-33
  - The dispenser housings are located underneath the aircraft and are designed to remain installed in the aircraft for quick loading and unloading of the magazine assemblies; six dispensers are on the P-3 AIP aircraft—two dispenser housings located on the nose of the aircraft and one on each side of the nose wheel well door
  - The magazine assemblies are loaded into each dispenser housing; each magazine is partitioned into two sections, tubes 1 through 10 and tubes 11 through 30

![Figure 15-33 — AN/ALE-47 cockpit controls.](image)
Weapon System

The weapon system consists of the equipment and accessories necessary for loading, carrying, and releasing of kill and search stores. The weapon system is composed of two subsystems, the armament (kill store) subsystem and the ordnance (search store) subsystem.

The armament system refers to equipment used for carriage and delivery of weapons/stores from the wing and bomb bay stations. The ordnance system refers to equipment used for carriage and delivery of search stores.

A maximum of eight bomb bay stations and ten wing stations are available for carriage of weapons. Forty-eight unpressurized sonobuoy launch tubes (SLTs), three pressurized SLTs, and one free fall chute are used with the search store system.

Bomb Bay System

The bomb bay is designed to carry various arrangements of weapons with a maximum of eight stations available at one time. The eight basic stations (Figure 15-34) are arranged in two layers; odd-numbered stations in the upper layer and even-numbered stations in the lower layer. This configuration places a limitation on the order of release of weapons in the upper layer; a weapon in the upper layer cannot be released until the interfering weapon in the lower layer has been released.

Basic configuration permits mixed store loading to meet varied operational requirements. Bomb racks are attached to removable pylons with two types of pylons being used (primary pylon and 1,000/2,000-pound class store pylon). Each bomb rack installation is assigned a number or a number followed by a letter. Bomb rack weight limitations are determined by Tactical Manual (TACMAN) station loading authorization.

Figure 15-34 — P-3 Bomb bay weapon stations.
Search Store System

The search store system provides the equipment and controls for selection and release of size “A” sonobuoys from 48 unpressurized SLTs, three pressured SLTs, and one free fall chute. The 48 unpressurized SLTs are not accessible from inside the aircraft and must be loaded while the aircraft is on the ground.

The three pressurized SLTs are accessible from inside the aircraft and may be loaded during flight. Stowage is provided in the aft cabin for 36 size “A” sonobuoys. The unpressurized free fall chute is provided for the release of size “A” and size “B” sonobuoys or other similar size search stores as may be authorized.

Unpressurized SLTs

The 48 unpressurized SLTs are designated by letters A through G and numerals 1 through 8. These launchers must be loaded while the aircraft is on the ground. The breech assembly is mounted at the top of the launcher tube. Sonobuoy launch containers (SLCs) are retained by a quarter turn cam retention device on the SLT which mates with the retention plate on the closed end of the SLC.

Suspension and Accessory Equipment

The following data is intended to provide ordnance personnel with a brief description of suspension and accessory equipment specifically used with the P-3 aircraft. Detailed information is available in the Airborne Weapons/Stores Loading Manual, NAVAIR 01-75PAC-75.

Bomb Bay Pylon Assemblies

The P-3 bomb bay is capable of being configured with the pylon assemblies described in the following paragraphs.

Primary Pylon Assembly

Four primary pylon assemblies (Figure 15-35) are provided for carrying a maximum of eight bomb bay stores. The pylon consists of two BRU-12/A bomb racks mounted between two pylon ends. The racks are removable from the pylon ends and the assembly is removable from the bomb bay. A quick-release diagonal strut is attached between the pylon ends to maintain rigidity. Sway braces are an integral part of the pylon ends.

1,000/2,000-Pound Class Store Pylon Assembly

Three 1,000/2,000-Pound Class Store Pylon Assemblies are provided for carrying a maximum of three 1,000-pound or one 2,000-pound class weapon. The assembly consists of a BRU-14/A bomb rack with mounting adapters (or Aero 1A/1B adapters on station 4C), or mounted on a one-piece pylon. The bomb rack is attached to the adapters and the adapters are attached to the pylon. Four sway braces are used with each pylon assembly and attached to the bomb bay overhead. Three hoist positions are provided on the pylon and are identified as HOIST POSITION A, B, and C. Their use is determined by the relation of the weapon suspension lugs and the Center of Gravity (CG) of the weapon.
Bomb Bay Stations

*Figure 15-36 and Figure 15-37 illustrate the bomb bay configurations for various loads. Each configuration is identified by letter (A, B, C, etc.) or name (Basic, Special, etc.). See the P-3 Tactical Manual for current authorized configurations/loads.*
Figure 15-36 — P-3 bomb bay configuration.
Table 15-1 shows configuration capabilities for the wing stations. Figure 15-38 should be used with Table 15-1 for various stores. The P-3 Tactical Manual should be consulted for current authorized configurations and loads.

Table 15-1 — Wing Station Configuration Capabilities

<table>
<thead>
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<th>Equipment</th>
<th>Loading Stations</th>
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</thead>
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<tr>
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<tr>
<td>Standardized Pylon</td>
<td>X</td>
</tr>
<tr>
<td>ADU-299/LAU-7</td>
<td>X</td>
</tr>
<tr>
<td>AN/ALE-37A</td>
<td>X</td>
</tr>
<tr>
<td>LAU-117</td>
<td>X</td>
</tr>
<tr>
<td>AN/AWW-13</td>
<td></td>
</tr>
</tbody>
</table>

Figure 15-37 — P-3 primary bomb bay configuration

Wing Stations

For more information on the P-3 aircraft, refer to Airborne Weapons/Stores Loading Manual, NAVAIR 01-75PAC-75.
P-8 AIRCRAFT

The P-8A (Figure 15-39) is designed to replace the P-3C aircraft as a long-range ASW, anti-surface warfare (ASuW), intelligence, surveillance and reconnaissance (ISR) aircraft capable of broad-area, maritime, and littoral operations.

Aircraft Armament System

The aircraft armament system consists of the following systems and subsystems, which provide the common circuits, basic controls, and components necessary to launch Mk 54 torpedoes, sonobuoys, and expendable countermeasures or to safely jettison Mk 54 torpedoes or air-launched missiles and expendable countermeasures.

The following paragraphs provide a brief description of the aircraft armament systems.

Secondary Power Distribution System

The secondary power distribution system (SPDS) is an electronic power distribution and control system for mission and weapons systems.

Secondary Power Distribution System Control Display Unit

The secondary power distribution system control display unit (SPDS CDU) allows for operator interface with and the display of the status of the systems controlled by the SPDS as well as ground or flight indications from the proximity switch electronics unit (PSEU).
Proximity Switch Electronics Unit
The PSEU is located in the forward equipment bay and monitors landing gear/WOW proximity sensors to provide in air/on ground indications to aircraft systems and provides an interlock to aircraft armament systems.

Mission Computing and Display System and Crew Workstations
The mission computing and display system (MCDS) manages the inventory, monitoring, programming, presetting, selection, and release of all weapons and sonobuoys. This interface is provided at any of the mission crew workstations and is primarily displayed with three separate programmable entry panels (PEP). These panels are selectable from the STORES tab and are labeled as follows: setup stores, search stores, and kill stores. The setup stores PEP is used primarily to allow operators to manage the SMS (e.g. inventory reconciliation, command restart) and power stores loads on and off.

Stores Management System
The SMS provides for the interface, control and release functions of weapons and stores from the aircraft weapon stations and launchers.

Weapons Control Panel
The stores management weapons control panel (Figure 15-40) provides a means for the application of power to the armament and search stores subsystems. It provides the controls to release sonobuoys, select the type of jettison desired, and execute the jettison cycle.

Armament Subsystems
The following paragraphs describe the aircraft armament subsystems and components.

Torpedo Release System
The torpedo release system provides for the carriage and launch of the Mk 54 torpedo and consists of the following basic controls and indicators.

- A master arm switch arms the weapon selected for release using a guarded switch
- A KILL READY light is located on the weapons control panel and illuminates red to indicate that the selected weapon is armed and ready for release and will extinguish when a weapon is released
- Control wheel release switches (Figure 15-41) are located on the inboard handle of the pilot and copilot control wheel and enables release of torpedoes; the switch is guarded to prevent inadvertent releases
- The weapons bay is located below the cabin area just aft of the wing; stations 5 through 9 are mounted directly to the aircraft structure, and interface with station control units labeled 8, 9, and 10 and has the capability of releasing Mk 54 torpedoes
BRU-75/A Bomb Rack Power Switch

The BRU-75/A bomb rack power switch is located on the BRU-75/A bomb rack panel and provides enabling or disabling of all bomb rack functions. The ON position enables all bomb rack electrical functions, thereby “arming” the bomb rack. The OFF position disables all bomb rack electrical functions and is the primary means of safing loaded stations.

Sonobuoy Launch system

The sonobuoy launch system (SLS) provides for the carriage and launch of sonobuoys and other devices. The following paragraphs provide a brief description of the SLS controls and indicators.

Sonobuoy Rotary Launcher

Three sonobuoy rotary launchers (SRLs) (Figure 15-42) are located in the aft section of the main deck. Each SRL holds up to 10 size “A” sonobuoys mounted in a rotary carousel. When commanded by the station control unit (SCU), the carousel rotates to the commanded position and pneumatically launches the sonobuoy downward through an SLT and gate valve, then out of the aircraft.
Single Sonobuoy Launcher
Three single sonobuoy launchers (SSLs) are located in the aft section of the main deck. The SSL is a floor-mounted, pneumatically operated launcher designed for manual loading and launching of a single sonobuoy.

Sonobuoy Free Fall Chute
The free fall chute allows for objects to be free fall dropped from the aircraft. When not in use, a lid is secured in place by Velcro® to hook-and-loop straps.

Sonobuoy Storage Racks
Two sonobuoy storage racks (Figure 15-43) are located in the aft section of the main deck forward of the sonobuoy launchers. The storage racks provide a structure to retain and locate the SLCs.

Countermeasures Dispenser Assembly
The P-8 aircraft has a total of four countermeasure dispensers designated Fwd left 1A, Fwd right 1B, Aft left and Aft right 2B. Two dispenser housings are located on the forward underside section of the aircraft aft of the cargo door. Two dispensers are located on the aft wing to body fairings at FS 1013. The dispenser housing is designed to remain installed in the aircraft for quick loading and unloading of the magazine assemblies.

AN/ALE-47 Countermeasure Dispensing System
The P-8 uses the AN/ALE-47 countermeasures dispensing system to protect the aircraft against anti-air threats. The AN/ALE-47 countermeasures dispensing system provides for threat-adaptive, reprogrammable, computer-controlled dispensing of decoys to confuse and jam enemy electronic tracking, missile guidance, and homing systems. The system ejects expendable payloads consisting of chaff, flares, or RF jammers in manual, semiautomatic, or automatic modes based on software-controlled programs from two 32-round dispenser magazines located on each side of the forward and aft fuselage.

Jettison System
The jettison system provides for the safe jettison of weapon bay and external weapons and stores. The following paragraphs describe additional components and controls of the jettison system.

Jettison Select Switch
The jettison select switch is located on the weapons control panel. Selective jettison is the process by which the operator may individually jettison specific stores. For selective jettison, individual stations must be selected by the mission crew before the flight crew executes the selective jettison function.
Jettison External Switch

The jettison external switch is located on the weapons control panel. External jettison is used to jettison all external weapons/stores. The stores in the weapon bay are not subject to this process.

Jettison All Switch

The jettison all switch is located on the weapons control panel. In the jettison all process all stores available are jettisoned in sequence. During execution, the weapons bay doors are automatically opened and closed to allow the weapons bay to jettison stores. The flight crew commands the jettison all mode by selecting ALL on the jettison mode selector and then pushing the execute switch.

Jettison Execute Switch

The jettison execute switch is located on the weapons control panel. The jettison execute switch is a guarded switch that initiates the selected jettison mode.

Jettison release is accomplished by a series of switch selections and interfaces within the SMS components. When an event occurs that requires jettison, the pilot must decide which type of jettison is appropriate for the situation by moving the JETTISON rotary switch to SEL (selective), EXT (external), or ALL position. If selective jettison is chosen, the operator (normally TACCO) will have previously selected the weapon to be jettison on the MCDS kill store PEP. The jettison light on the SMS mode indicator illuminates on the setup stores PEP. The pilot lifts the red guard cover and activates the JETTISON switch to the EXECUTE position.

Suspension and Accessory Equipment

The following data is intended to provide ordnance personnel with a brief description of suspension and accessory equipment specifically used with the P-8 aircraft. Detailed information is available in the Airborne Weapons/Stores Loading Manual, NAVAIR A1-P8AAA-LWS-000.

SUU-92/A Wing Pylon

The P-8A has four wing pylon (Figure 15-44) stations. Each wing has two wing pylon stations located outboard the engine nacelle. The pylon is attached to fittings on the lower surface of the wing. A pylon fairing provides an aerodynamic cover around the fittings and electrical connectors for the pylon. The wing pylons are identical and interchangeable among the four stations. The wing pylon has access panels to provide access to electrical and pneumatic connections and to various components installed in the pylon to include: SCU, high pressure air compressor system (HPACS), pneumatic valve, and a BRU-76/A.

SUU-93/A Forward Fuselage Pylon

The P-8A has two forward fuselage pylon stations. The two fuselage pylons are mounted under the forward fuselage centerline of the aircraft. Pylons are externally mounted structures that house components for the carriage and release of weapons and stores. The BRU-75/A is installed within the pylon. The fuselage pylons are attached to the aircraft by four bolts. Each bolt passes through the top of the pylon and aircraft skin and is secured by internal hardware. The forward fuselage pylon has access panels to provide access to electrical and pneumatic connections and to various components installed in the pylon to include; SCU, HPACS, isolation valves, and a BRU-75/A.

BRU-75/A and BRU-76/A

The BRU-75/A suspends weapons and stores using 14-inch suspension hooks and BRU-76/A (Figure 15-44) uses 14- and 30-inch suspension hooks. Each BRU has electrical and pneumatic connections.
The BRUs have a pneumatic release assembly, safety interlock, and automatic sway bracing. The BRUs are electrically controlled by the SMS, and pneumatically operated by compressed air. The BRUs contain these components: pneumatic power module, ejector pistons nose, center and tail electrical arming units, positive arming latches, and sway brace assembly.

Aircraft Armament Configuration Capabilities
The basic configuration of the P-8 aircraft (Figure 15-45) consists of BRU-75/A, BRU-76/A, SUU-93/A, SRL, and SSL. For specific weapons configuration and capabilities consult the NTRP 3-22.4-P-8A.

Figure 15-44 — SUU-92/A wing pylon and BRU-76/A bomb rack.
MH-60 HELICOPTER

The MH-60 aircraft (Figure 15-46) provides for configured capabilities of ASW operations as the primary mission. Secondary missions include anti-ship surveillance and targeting, search and rescue, medical evacuation, vertical replenishment, and communication relay.

These following paragraphs provide a brief description of the aircraft armament systems, jettison system, suspension, and accessory equipment required. Carriage or electrical connection of a single load or mixed loads of conventional weapons on the aircraft is not permitted unless authorized by the tactical manual.

Aircraft Armament System

The aircraft armament system consists of the following systems and subsystems, which provide the common circuits, basic controls, and components necessary to release or jettison torpedoes, sonobuoys, expendable countermeasures, and stores, or fire Hellfire missiles.
Armament System Basic Controls
The MH-60R armament system basic controls consist of the following components: WOW switch, disabling switch for armament safety circuit, data handling system, primary mission/flight computer, SMS, and processing interface units.

Weight-On-Wheels Switch
The WOW switch functions as a safety interlock by disabling release and jettison circuits while the aircraft is on deck.

Disabling Switch for Armament Safety Circuit
This switch functions as an override to disable the WOW switch when the aircraft is on deck. The purpose of this switch is to allow operational testing of the armament system.

Data Handling System
The data handling system provides for the operator interface, processing, and display of all avionics and weapons systems.

Primary Mission/Flight Computer
The primary mission/flight computer is a digital computer that interfaces with all weapons and avionics systems and performs all processing for displays, built-in-test (BIT), and armament system functions.
Stores Management System

The SMS provides the interface, control, and release functions of weapons and stores from the aircraft weapon stations and launchers.

Processing Interface Units

The processing interface units provide the interface between the weapons/stores and the primary flight/mission computer and other onboard avionics systems.

Cockpit Basic Controls

The following paragraphs provide a brief overview of the armament displays, controls, and components to include armament control indicator (ACI), mission displays, and control indicators.

Armament Control Indicator

The ACI panel (Figure 15-47) is located on the lower console and is a component of the SMS. The ACI contains the covered MASTER ARM and ARM SAFE indicators. In addition, the ACI contains control functions for the jettison, sonobuoy, and Hellfire armament subsystems.

Mission Displays

The mission displays are located on both pilot and copilot instrument panels and are components to the data handling system. The displays provide BIT, caution/advisory indications, and other SMS selectable information. Information and data are selectable with the 22 pushbutton switches located around the display bezel.

Control Indicators

Control indicators are located on both the pilot and copilot lower console and are components to the data handling system. Control indicators consist of three keyboards and are used to interface with aircraft avionics systems.

Sensor Operator Station Basic Controls

The following paragraphs provide a brief overview of the displays located at the sensor operator station.

Mission Display

The sensor operator mission display is located on the sensor operator console. The display performs the same functions as the pilot/copilot display.
Control Indicator
The sensor operator control indicator is located on the sensor operator console and oriented horizontally instead of vertically. This component provides interaction with avionics systems from the sensor operator console.

Armament Subsystems
This section discusses the armament subsystems associated with the MH-60R platform and describes the following subsystems: torpedo release system, sonobuoy launch system, AGM-114 Hellfire missile system, defensive countermeasures, and jettison system.

Torpedo Release System
The torpedo release system is capable of controlling and releasing up to four (growth provisions provided by the right outboard station) torpedoes and consists of the basic components that are common to all of the armament subsystems. The following paragraphs describe additional components and controls of the torpedo release system.

- Signal Data Converter (SDC)—is located in the transition section on the starboard support shelf and a component of the SMS, the SDC provides Mk 50 torpedo heater power
- Hand Control Unit (HCU)—is located on the starboard side of both pilot and copilot seats; the HCU contains the RELEASE CONSENT switch, which allows the pilot or copilot to release torpedoes

Sonobuoy Launch System
The sonobuoy launch system is capable of controlling and launching up to 25 sonobuoys. The system consists of the following components.

- The sonobuoy launcher is located in the cabin on the port side aft of the sensor operator seat and provides a housing and launch platform for 25 sonobuoys
- The pneumatic supply module and manifold is located under the sonobuoy launcher and consists of a pressure bottle, pressure gauge, manual dump valve, and a SAFE/ARM lever; the supply module provides the pneumatic charge that ejects the selected sonobuoy
- The distribution module connects the compressed air supply with the selected launcher tube by way of a rotary valve; stepper motor drives the rotary valve to the selected tube and is stopped by a position potentiometer; a selection knob on the distribution module provides manual selection of a sonobuoy tube; a distribution valve lock allows the rotary valve to be locked in any tube or vent position and indicator window
- The signal data converter is a component of the SMS that provides power to the sonobuoy launch system
- The BUOY LAUNCH RDYAWAY switch and indicator are used to manually launch a sonobuoy from a loaded launch tube; an example of the MH-60R sonobuoy launch system is shown in Figure 15-48
AGM-114(Series) HELLFIRE Missile Control System

The AGM-114(series) Hellfire missile control system provides for the carriage and launch of the AGM-114 Hellfire missile. The Hellfire missile system consists of the following basic components and controls.

- The extended pylon is located on the port side aft of the aircraft (Figure 15-49), and provides for the carriage of the Hellfire missile.

- The AN/AAS-44 FLIR subsystem provides the capability to detect targets, determine target range, and laser designate the target for Hellfire guidance; FLIR system displays are provided on the mission displays.

- The rotor overspeed and FLIR switch assembly panel contains the LASER and GIMBLE ENABLE/DISABLE switches; the switches either enable or inhibit laser firing and FLIR turret slewing; the FLIR laser can also be enabled and disabled from the sensor operator utility light panel.

- Sensor operator utility light panel contains the LASER ENABLE/DISABLE switch and is wired in series and functionally identical to the rotor overspeed and FLIR switch assembly LASER ENABLE/DISABLE switch.
• LASER SELECT switch and ARM/SEL indicator is a two-position switch; the SAFE position safes the LASER, while the SELECT position provides for LASER arming; the ARM indicator provides an indication that the LASER is selected, and that LASER ENABLE and other interlocks are completed; the SEL indicator provides an indication that the LASER is selected, but LASER ENABLE and other interlocks are not completed.

• The hand control unit, located on the starboard side of both pilot and copilot seats and on the starboard side of the sensor operator console, provides the operator interface for the FLIR and the ability to launch Hellfire missiles.

• The signal data converter (SDC), located in the transition section on the starboard support shelf and a component of the SMS, provides MIL-STD-1760 power control and interface for the M299 Hellfire launcher.

• The M299 Hellfire launcher is installed on the extended pylon and is used to mount and launch the Hellfire missile; the launcher consists of four launcher rails and a SAFE/ARM switch, which automatically arms as a function of Hellfire missile control system operation, but must be manually placed in the SAFE position.

Jettison System

The system is capable of jettisoning all weapons/stores or selected weapons/stores. The jettison system will be armed when the aircraft is in a weight-off-wheels condition or by engaging the armament safety bypass circuit. Activating the emergency jettison panel ALL STORE JETT switch will jettison all weapons/stores with the exception of jettisonable AN/ALE-47 countermeasures dispensing system expendables. Selecting the MASTER ARM switch on the ACI, then selecting the appropriate weapon station or system, and actuating the SELECT JETTISON switch selectively jettisons weapons, stores, or AN/ALE-47 countermeasures dispensing system expendables.

Figure 15-49 — MH-60R Hellfire missile control system.
Defensive Countermeasure System

The MH-60R uses the AN/ALE-47 countermeasures dispensing system (Figure 15-50) to protect the aircraft against anti-air threats. The AN/ALE-47 countermeasures dispensing system provides for threat-adaptive, reprogrammable, computer-controlled dispensing of decoys to confuse and jam enemy electronic tracking, missile guidance, and homing systems. The system ejects expendable payloads consisting of chaff, flares, or RF jammers in manual, semiautomatic, or automatic modes based on software-controlled programs from two 32-round dispenser magazines located on the tail pylon. The AN/ALE-47 consists of the following components.

- The AN/ALE-47 programmer functions as the central processor for the AN/ALE-47 system; it contains dispense programming software and controls dispensing for all modes of operation.

Figure 15-50 — MH-60R AN/ALE-47 countermeasures dispensing system.
• The dispenser magazine identification (ID) switches consist of two four-position (A–D and 1–4) rotary switches that indicate specific expendable payload load outs for decoding and to be used by the programmer

• The AN/ALE-47 safety switch/pin is opened by inserting AN/ALE-47 safety pin, which inhibits AN/ALE-47 dispenses


SAFETY PRECAUTIONS

The safety precautions that should be followed when dealing with aircraft, systems, and their maintenance are outlined in various publications. The repetition of safety precautions in the manuals ensures they are widely distributed and read. A few of the safety precautions applicable to the aircraft discussed in this chapter are listed below.

• Do not open or close the bomb bay doors when personnel or equipment are in the vicinity of the bomb bay; also, do not enter the bomb bay until the door safety pin is installed

• Beware of APU noise; it can cause permanent ear damage to the unprotected ear; wear ear protection devices when working in the vicinity of an operating APU

• Provide adequate interphone communications between personnel inside and outside the aircraft to ensure safety between personnel and to compensate for the size of the aircraft

• Before you apply external power to the aircraft, make sure that personnel are not performing maintenance on electrical or electronic systems; you should make sure that all cockpit switches and controls are ready to receive power

• Personnel working with or near high voltage shall be familiar with modern methods of resuscitation

• Observe the aircraft external danger areas shown in the particular loading manual

• The mechanical latching of weapons on aircraft racks/launchers shall be completed before the engine(s) on that aircraft is/are started unless otherwise specified in loading publications

• Properly adjust sway braces to avoid inadvertent release or hung weapons and may result in loss of life and/or damage to property

• Do not unnecessarily work/stand directly in front of or behind forward firing ordnance

• Do not unnecessarily work beneath a weapon/store

• When loading/handling forward firing ordnance, working in front of or behind will be held to a minimum
End of Chapter 15

Aircraft Weapons Systems

Review Questions

15-1. What system provides the interface, control, and release functions of the F/A-18A/B/C/D aircraft weapon stations and guns?
   A. Armament override
   B. Auxiliary
   C. Master arm
   D. Stores management

15-2. The IR COOL switch is a three-position switch that controls cooling to what missile?
   A. AGM-65
   B. AIM-120
   C. AIM-7
   D. AIM-9M

15-3. Which of the following selected fuzing voltages are supplied by the electric fuzing system in the F/A-18E/F aircraft?
   A. INST, DLY, DLY 2, and DLY 3
   B. INST, DLY 1, DLY 2, and DLY 3
   C. VT, INST, DLY 1, and DLY 2
   D. VT, INST, DLY 1, and DLY 6

15-4. At what time will the electrical fuzing system in the F/A-18A/B/C/D provide the fuzing voltage to electrically fuzed bombs?
   A. After 1 second from release
   B. After delay of two seconds
   C. Three seconds before the bomb rack opens
   D. When bomb rack hooks open

15-5. What launcher must be used to launch an AIM-7 Sparrow missile from the wing pylon station of an F/A-18E/F aircraft?
   A. LAU-113B/A
   B. LAU-115C/A
   C. LAU-117/A
   D. LAU-118/A
15-6. On a P-3 aircraft, what panel provides the controls and indicators for manual or automatic preset of Mk 46, Mk 50, or Mk 54 torpedoes?

A. Armament control box  
B. Pilot's armament control  
C. Pilot's search stores control  
D. TORP presetter

15-7. On a P-3 aircraft, what maximum number of bomb bay stations is available for carrying weapons?

A. 6  
B. 8  
C. 10  
D. 12

15-8. What total number of sonobuoy rotary launchers are installed on a P-8 aircraft?

A. 1  
B. 2  
C. 3  
D. 4

15-9. On a P-8 aircraft, each sonobuoy rotary launcher will hold what maximum size “A” sonobuoys?

A. 5  
B. 10  
C. 15  
D. 20

15-10. The P-8 aircraft has what total number of wing stations?

A. 4  
B. 8  
C. 12  
D. 16

15-11. The MH-60R torpedo release system is capable of controlling and releasing up to what total number of torpedoes?

A. 1  
B. 2  
C. 3  
D. 4
15-12. An MH-60R helicopter sonobuoy launch system is capable of controlling and launching up to what total number of sonobuoys?

A. 10  
B. 12  
C. 18  
D. 25

15-13. What condition must be ensured before opening or closing aircraft bomb bay doors?

A. Personnel or equipment are not in the vicinity of the bomb bay  
B. Bomb bay door safety pin is installed  
C. Aircraft is in the appropriate maintenance spot  
D. Aircraft has come to a complete stop

15-14. What must be ensured before you apply external power to the aircraft?

A. Aircraft has already been loaded  
B. Personnel are wearing ear protection devices  
C. Personnel are not performing maintenance on electrical/electronic systems  
D. Personnel are only performing maintenance on their assigned electrical systems

15-15. Improper adjustment of sway braces can cause inadvertent release or what other action to weapons or stores?

A. Cause the weapons to dud  
B. Hung weapons  
C. Premature arming  
D. Tumbling effect of the weapon
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