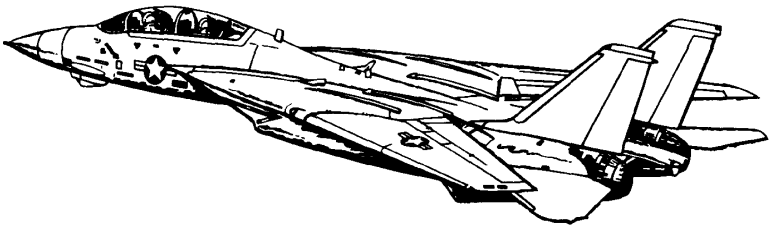
Pocket Checklist

F-14A/B AIRCRAFT

REV: 20220116



Contents

1 PROCEDURES

1.1 PILOT - PRE-START

1.	**Parking Break**	**ENGAGED**
2.	**Ground Power**	connected
3.	**Compressed Air**	connected
4.	**ICS**	**HOT MIC**
5.	**TO RIO**	*"Begin Start-Up"*
6.	**ICS**	**Comm Check**
7.	**MASTER TEST Selector**	(a) **LTS** · **Warning Lights** ..... checked · **Caution Lights** ..... checked · **Advisory Lights** ..... checked (b) **FIRE DET/EXT** · **L FIRE GO** ..... illuminated · **R FIRE GO** ..... illuminated (c) **INST** · **RPM** ..... 96% · **EGT** ..... 960 C · **FF** ..... 10500 pph · **AOA** ..... 18 ± 5 · **Wing Sweep** ..... 45 ± 2.5 · **FUEL QTY** ..... 2000 ± 200 · **Oxygen QTY** ..... 2 liters · **L&R FF lights** ..... illuminated (d) **OFF**
8.	**Ejection Seat**	Armed
9.	**RIO**	Canopy Closed
10.	**Oxygen**	**ON (FWD)**
11	**Emergency Wing Sweep**	**OVERSWEEP**

1.2 PILOT - ENGINE START

1.	**AIR SOURCE**	**OFF**
2.	**Hydraulics**	(a) **HYD TRANSFER PUMP** ..... **SHUTOFF** (b) **Emerg. Hyd.** ..... **AUTO (LOW)**
3.	**L&R MASTER GEN**	**NORM**
4.	**RIO**	*"Ready to Start"*
5.	**Right Engine Start-Up**	(a) **Engine Crank** ..... **R** (b) **R Eng N2** ..... 20% (c) **R Throttle** ..... **IDLE** (d) **TIT** .....< 890 C during start (e) **R GEN CAUTION** ..... extinguished
6.	**Stabilized Parameters**	· **RPM** .....62-78% · **TIT** ..... approx 500 C · **Fuel Flow** .....950-1400 pph · **NOZ** ..... 5 (100%) · **Oil Pressure** ..... 25-35 psi · **Hyd Pressure** ..... 3000 psi
7.	**Left Engine Start-Up**	(a) **Engine Crank** .....**L** (b) **L Eng N2** ..... 20% (c) **L Throttle** ..... **IDLE** (d) **TIT** .....< 890 C during start (e) **L GEN Caution** .....extinguished
8.	**Stabilized Parameters**	· **RPM** .....62-78% · **TIT** ..... approx 500 C · **Fuel Flow** .....950-1400 pph · **NOZ** ..... 5 (100%) · **Oil Pressure** ..... 25-35 psi · **Hyd Pressure** ..... 3000 psi
9.	**HYD TRANSFER PUMP**	**NORM**
10.	**HYD PRESSURE**	3000 psi
11.	**AIR SOURCE**	**BOTH ENG**
12.	**Ground Power**	disconnected
13.	**Compressed Air**	disconnected

1.3 PILOT - POST-START

1.	**TO RIO**	*"Both Engines Running"*
2.	**Displays Control Panel**	· **VDI** ..... **ON** · **HUD** ..... **ON** · **HSD** ..... **ON** · **HDS MODE** ..... **TID** (monitor INS)
3.	**RIO**	**Select Align Quality** · **INS GO NOW:** shortest but least precise alignment · **INS GO COARSE:** does not meet Launch Criteria for AIM-7 / AIM-54 · **INS GO MIN WPN LAUNCH:** allows AIM-7 / AIM-54 launch · **INS GO FINE** fine align (8 min)
4.	**ACM Panel**	· **GUN RATE** ..... as required · **SW COOL** ..... **OFF** · **MSL PREP** ..... **OFF** · **Missile MODE/STP** ..... **NORM**
5.	**Gun Rounds**	**Set**
6.	**ANTI-SKID SPOILER BK**	**OFF**
7.	**Emergency Wing Sweep**	(a) **Handle** ..... **AFT** (b) **Angle** ..... Verify 68 deg
8.	**AFCS Panel - SAS STAB AUG**	· **PITCH** ..... **ON** · **ROLL** ..... **ON** · **YAW** ..... **ON**
9.	**WING/EXT TRANS**	**AUTO**
10.	**UHF 1 Function Selector**	**BOTH**
11.	**TACAN Function Selector**	**T/R**
12.	**ARA-63 ICLS RECEIVER**	**ON**

13.	**Radar Altimeter**	(a) **Control Knob** ..... one click CW to turn on (b) **Display** ..... 6000 ft (warm up) (c) **Display** ..... 0 ft (ready)
14.	**Standby ADI**	erect at least 2 min before T/O
15.	**KY-28 Crypt. Key**	**Set** (refer to GROUND SETTINGS kb)
16.	**RIO**	set D/L frequency
17.	**Lights**	As desired

1.4 RIO - PRE-START

1.	**Oxygen**	**ON (FWD)**
2.	**PILOT**	· **Ground Power** ..... connected · **Compressed Air** ..... connected
3.	**ICS**	Comm Check
4.	**Lights**	As required
5.	**LTS Test**	Coordinate with Pilot
6.	**Ejection Seats**	**ARMED**
7.	**Canopy**	**CLOSED**
8.	**TO PILOT**	*"Ready to Start"*

1.5 RIO - POST-START - SHORE

1.	**PILOT**	· **Engines** ..... started · **AIR SOURCE** ..... BOTH ENG
2.	**INS STARTUP**	(a) **LIQUID COOLING** ..... **ON (FWD)** (b) **WCS Switch** ..... **STANDBY** (c) **IR/TV Power** ..... **STBY/IR/TV** (d) **TID/DDD** ..... illuminated after 40 s
3.	**Kneeboard**	Retrieve Coordinates, Elevation, Magnetic Variation from GROUND SETTINGS Page
WARNING Input Coords **BEFORE** selecting **GND ALIGN** if using ASH		
4.	**Start INS Align**	(a) **Nav Mode** ..... **GND ALIGN** (b) **CAP** · **Category** ..... **NAV** · **MESSAGE** ..... **OWN AC** (c) **Keyboard** · **CLEAR**, **LAT**, latitude, **ENTER** · **LONG**, longitude, **ENTER** · **ALT**, altitude, **ENTER** (d) **CAP MESSAGE** ..... **MAG HDG VAR** (e) **Keyboard** ..... **HDG**, mag var, **ENTER** (f) **Align Progress** ..... Monitor
5.	**U/VHF Mode**	**T/R G**

6.	**Datalink**	(a) **Kneeboard** ..... TACTICAL DL (b) **DL Power** ..... **ON (FWD)** (c) **DL Mode** ..... **TAC (AFT)** (d) **DL Freq.** ..... **Set**
7.	**TACAN**	**T/R**
8.	**RWR Panel**	(a) **Display Type** ..... **NORM** (b) **PWR** ..... **ON** (c) **TEST** ..... **SPL** (d) **MODE** ..... **LMT**
9.	**DECM**	**STBY**, then **ACT**
10.	**IFF**	(a) **MASTER** ..... **STBY** (b) **CODE** ..... as required
11.	**Altimeter**	Reset
12.	**CAP**	Enter Data (WP, FP, *etc.*)
13.	**Displays**	· **DDD** ..... Set · **TID** ..... Set · **Multiple Display Indicator** ..... Set
14.	**Hand Control Panel**	Set
15.	**AN/ALE-39**	Set (as required) · **AUTO (CHAFF)/MAN** · **MAN**
16.	**Flare Mode**	**PILOT**
17.	**Complete INS Align**	· **Duration Full Fine** ..... 8 min · **Duration ASH** ..... much faster (a) **Align Complete** ..... Caret → Diamond (b) **NAV Mode** ..... **INS NAV**
18.	**Standby ADI**	Erect at least 2 min before T/O
19.	**TO PILOT**	*"Ready to Taxi"*
Once Airborne		
20.	**IR/TV Power**	**ON**
21.	**WCS Switch**	**WCS XMT**

1.6 RIO - POST-START - CARRIER

1.	**PILOT**	· **Engines** ..... started · **AIR SOURCE** ..... BOTH ENG
2.	**INS STARTUP**	(a) **LIQUID COOLING** ..... **ON (FWD)** (b) **WCS Switch** ..... **STANDBY** (c) **IR/TV Power** ..... **STBY/IR/TV** (d) **TID/DDD** ..... illuminated after 40 s
3.	**Datalink**	(a) **Kneeboard** ..... TACTICAL DL (b) **DL Power** ..... **ON (FWD)**
4.	**Start INS Align**	(a) **DL FREQ** ..... Set (b) **DL Mode** ..... **CAINS/WAYPT** (c) **Nav Mode** ..... **CVA**
5.	**U/VHF Mode**	**T/R G**
6.	**TACAN**	**T/R**
7.	**RWR Panel**	(a) **Display Type** ..... **NORM** (b) **PWR** ..... **ON** (c) **TEST** ..... **SPL** (d) **MODE** ..... **LMT**
8.	**DECM**	**STBY**, then **ACT**
9.	**IFF**	(a) **MASTER** ..... **STBY** (b) **CODE** ..... as required
10.	**Altimeter**	Reset
11.	**CAP**	Enter Data (WP, FP, *etc.*)
12.	**Displays**	· **DDD** ..... Set · **TID** ..... Set · **Multiple Display Indicator** ..... Set
13.	**Hand Control Panel**	Set
14.	**AN/ALE-39**	Set (as required) · **AUTO (CHAFF)/MAN** · **MAN**
15.	**Flare Mode**	**PILOT**

16.	**Complete INS Align**	· **Duration Full Fine** ..... 9 min · **Duration ASH** ..... much faster (a) **Align Complete** ..... Caret → Diamond (b) **NAV Mode** ..... **INS NAV**
17.	**Datalink**	(a) **DL Mode** ..... **TAC (AFT)** (b) **DL Freq.** ..... **Set**
18.	**Standby ADI**	Erect at least 2 min before T/O
19.	**TO PILOT**	*"Ready to Taxi"*
Once Airborne		
20.	**IR/TV Power**	**ON**
21.	**WCS Switch**	**WCS XMT**

1.7 PRE-TAXI

1.	**ANTI-SKID SPOILER BK**	**OFF**
2.	**HOOK BYPASS**	As Required
3.	**Nose Strut**	**RETRACTED**
4.	**HUD MODE**	**TO**
5.	**Parking Brake**	**Released (IN)**
6.	**NWS**	**ENGAGED**
7.	**Path**	verify clear

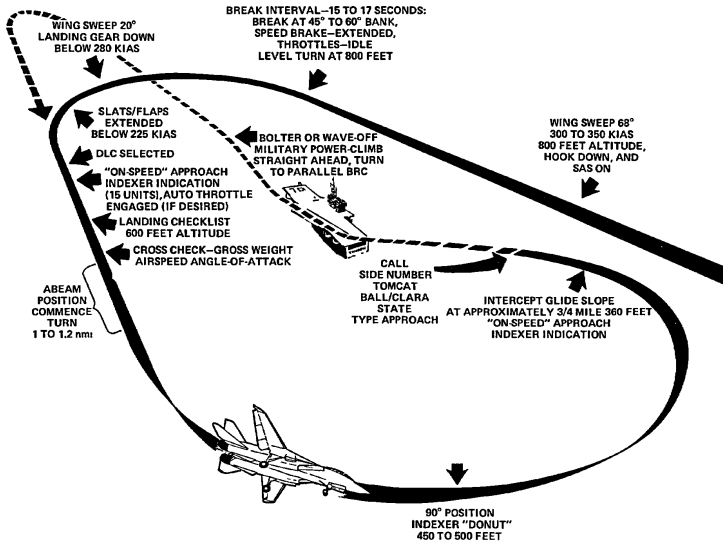
1.8 TAKEOFF - SHORE

		After Lining Up On Runway
1.	**Wing Sweep**	(a) **EM WING SWEEP** ..... **FWD**, then **IN** (b) **MASTER RESET** ..... **PRESS** (c) **Wings** ..... Verify thumb controller (d) **WING SWEEP** ..... **AUTO** (e) **Wings** ..... Verify at 20 deg
2.	**ANTI SKID SPOILER BK**	**BOTH (UP)**
3.	**FLAPS**	**UP**
4.	**Trim**	0 deg
5.	**NWS**	**DISENGAGED**
6.	**Takeoff**	(a) **Throttle** ..... **MIL** (90% RPM) (b) **Stick** ..... **Back** at 130 KIAS (c) **Rotation** ..... approx 140 KIAS (d) **GEAR** ..... **UP** < 250 KIAS

1.9 TAKEOFF - CARRIER

	Lineup	· Wait behind JBD until Catapult is clear · Follow Taxi Directors Instructions to line up on Catapult
1.	**Wing Sweep**	(a) **EM WING SWEEP** ..... **FWD**, then **IN** (b) **MASTER RESET** ..... **PRESS** (c) **Wings** ..... Verify thumb controller (d) **WING SWEEP** ..... **AUTO** (e) **Wings** ..... Verify at 20 deg
2.	**FLAPS**	**DOWN**
3.	**Launch Bar Preparation**	(a) **Nose Strut** ..... **KNEEL** when directed (b) **Throttle** ..... **UP** when directed (c) **Taxi** ..... launch bar into shuttle (d) **Throttle** ..... **IDLE** when directed
4.	**Trim**	2-3 deg nose up
5.	**Speed Brakes**	**IN**
6.	**Final Checks**	(a) **Throttle** ..... **MIL** when directed (b) **Control Wipeout** · Stick Full Forward · Stick Full Aft · Stick Full Left · Stick Full Right · Rudder Full Left · Rudder Full Right (c) **Eng. Inst.** ..... **Checked** (d) **Caution/Warnings** ..... **None**
7.	**Catapult Shot**	(a) **Salute** ..... **CAT SHOT** (b) **Gear** ..... **UP** < 250 KIAS (c) **Flaps** ..... **UP** < 225 KIAS
8.	**Clearing Turn**	

1.10 LANDING - OVERHEAD PATTERN



1.	**Initial Approach**	· **WING SWEEP** ..... **68 deg** · **HOOK** ..... **DOWN** · **SAS** ..... **ON** · **HUD** ..... **LDG** · **Airspeed** ..... **300-350 KIAS** · **Altitude** ..... **800 ft**
2.	**Initial Break**	· **Break Interval** ..... **15-17 s** · **BANK** ..... **45-60 deg** · **SPEED BRAKE** ..... **EXTEND** · **Throttle** ..... **IDLE** · **G** ..... **3-4 G** · **Altitude** ..... **800 ft**
3.	**Break Turn**	· **Wing Sweep** ..... **AUTO** < 280 KIAS · **Landing Gear** ..... **DOWN** < 280 KIAS · **FLAPS** ..... **DOWN** < 225 KIAS
4.	**Downwind**	· **DLC** ..... **Selected** once flaps out · **AOA** ..... **ON-SPEED** · **LANDING CHECKLIST** · **Altitude** ..... descend to **600 ft**

5.	Final Turn	**180 Deg Position** · **Abeam Pos.** ..... **1-1.2 nmi** **90 Deg Position** · **AOA** ..... **DONUT** · **Altitude** ..... **400-500 ft**
6.	Intercept Glides-lope	· **Distance** ..... **3/4 Mile** · **Altitude** ..... **360 ft** · **AOA** ..... **ON-SPEED**

1.11 LANDING - CHECKLIST

1.	Wing Sweep	**20 deg AUTO**
2.	Wheels	· **Lights** ..... **3 DOWN** · **Transition Light** ..... **OUT**
3.	SAS	**ON**
4.	FLAPS	**DOWN**
5.	DLC	**Checked**
6.	Hook	· **HOOK** ..... **DOWN** · **Transition Light** ..... **OUT**
7.	Harness	**Locked**
8.	Speedbrakes	**EXT**
9.	Brakes	**Check**
10.	Fuel	**Check**

1.12 AERIAL REFUELING

1.13 AIRSTART

· **Spooldown**	*Before significant spooldown* (a) **Non-Running ENG** ..... **IDLE** or above *If no relight occurs* (b) **Non-Running ENG** ..... **OFF** then **IDLE** *If still no relight occurs* (c) **ENG MODE** ..... **SEC** (d) **Non-Running ENG** ..... **OFF** then **IDLE**
· **Cross-Bleed Restart**	*With one ENG running, if Spooldown fails* (a) **Non-Running ENG** ..... **OFF** (b) **FUEL SHUT OFF** ..... check (c) **Running throttle** ..... 80%+ (d) **BACK UP IGNITION** ..... **ON** (e) **ENG CRANK** ..... non-running eng (f) **Non-Running ENG** ..... **IDLE** *If no start occurs* (g) **Non-Running ENG** ..... **OFF** then **IDLE** *If still no start* (h) **ENG MODE** ..... **SEC** (i) **Non-Running ENG** ..... **OFF** then **IDLE**
· **Windmill Restart**	(a) **Airspeed** ..... >450 kts (b) **Throttle** ..... IDLE or above (c) **BACK UP IGNITION** ..... ON *If no relight occurs* (d) **Throttle** ..... OFF then IDLE *If still no relight* (e) **ENG MODE** ..... SEC (f) **Throttle** ..... OFF then IDLE
· **Post Restart**	(a) **BACK UP IGNITION** ..... OFF (b) **ENG MODE** ..... PRI

2 SYSTEMS

2.1 AFCS - SAS

· **SAS**	· **Stability Augmentation System** – **Not Fly-by-Wire** – Automatic control surface commands generated by analog computer to improve stability
· **Controls**	· **Three individual Switches** – Pitch – Roll – Yaw
· **Autopilot Emergency Disengage Paddle**	· **Paddle on Stick** – Disengages Autopilot Modes – Deactivates Pitch, Roll SAS Channels

2.2 AFCS - AUTOPILOT

· **Attitude Hold**	· **Basic Attitude Hold** – Maintains existing pitch & roll – Attitude can be changed with stick input – If engaged outside limits will automatically move within range · **Limits** – Pitch: 30 deg – Roll: 60 deg · **Engagement** (a) **SAS Switches** ..... **ON (FWD)** (b) **Alt. Hold Mode** ..... **OFF** (c) **VEC/PCD/ACL** ..... **OFF** (d) **Heading Mode** ..... **OFF** (e) **Autopilot Switch** .... **ENGAGE (FWD)**

· **Altitude Hold**	· **Barometric Altitude Hold** – Maintains current barometric altitude · **Limits** – Vertical velocity: < 100 ft/s · **Engagement** (a) **SAS Switches** ..... **ON (FWD)** (b) **Autopilot Switch** .... **ENGAGE (FWD)** (c) **Alt. Hold Mode** ..... **ALT (FWD)** (d) **A/P REF Light** ..... Wait until appears (e) **NWS Button** ..... **Press**
· **Heading Hold**	· **Magnetic Heading Hold** – Maintains current magneatic heading · **Limits** – Bank angle < 5 deg · **Engagement** (a) **SAS Switches** ..... **ON (FWD)** (b) **Autopilot Switch** .... **ENGAGE (FWD)** (c) **Heading Mode** ..... **HDG (FWD)**
· **Ground Track**	· **Autopilot follows ground track** – Similar to heading hold – Compensates for wind drift – Uses INS data instead of mag. bearing · **Limits** – Bank angle < 5 deg · **Engagement** (a) **SAS Switches** ..... **ON (FWD)** (b) **Autopilot Switch** .... **ENGAGE (FWD)** (c) **Heading Mode** ..... **GT (AFT)** (d) **A/P REF Light** ..... Wait until appears (e) **NWS Button** ..... **Press**
· **VEC/PCD**	· **Vector / Precision Course Direction** – Allows Link 4 controller to remotely direct the aircraft – **Not Modelled in DCS**

· **ACL**	· **Automatic Carrier Landing** – See relevant section
· **Autopilot Emergency Disengage Paddle**	· **Paddle on Stick** – **Disengages Autopilot Modes** – **Deactivates Pitch, Roll SAS Channels**

2.3 APC / AUTOTHROTTLE

· **APC**	· **Approach Power Compensator** – Automatic throttle control – **Maintains ON SPEED AoA**
· **Conditions**	Engagement is inhibited / APC is disengaged if conditions not met · **Throttles** ..... 75%-90% RPM · **Landing Gear Handle** ..... **Down** · **Weight on Wheels** ..... **No**
· **Engage**	· **Throttle Mode** ..... **AUTO (FWD)**
· **Disengage**	**Cage/Seam Button**

2.4 ACLS

2.5 WING-SWEEP

· **Overview**	· **In Flight Limited between 20 deg & 68 deg** · **On Ground can Oversweep to 75 deg** · **Hydromechanically Controlled** – Automatically through CADC – Manually with emergency wing-sweep handle · **15 deg/s at 1g loading** · **Mechanically linked to ensure symmetry**

· **CADC Modes**	· **AUTO** – CADC controls wing position as function of current Mach via wing-sweep program · **MAN** – Pilot manually chooses desired wing sweep angle with thumb controller · **BOMB** – Sets wing sweep to **55 deg** or further aft
· **Emergency Mode**	· **Emergency Wing-Sweep Handle** – Moved with wing sweep program by spider detent under normal operation – Can be forced out of spider detent and moved manually
· **Oversweep**	· **Selected via Emergency Wing-Sweep Handle** (a) **Em. Wing-Sweep** ..... **68 deg** Wait for wing-seal airbags to deflate (b) **HZ TAIL AUTH** ..... **Illuminated** (c) **Em. Wing-Sweep** ..... **75 deg**
· **Return to CADC Control**	· **After Emergency Mode / Oversweep** (a) **Em. Wing-Sweep** ..... **Spider Detent** (Fwd on startup) (b) **MASTER RESET** ..... **Press**

Indicated Mach	Max Forward Wing Position
0.4	20 deg
0.7	25 deg
0.8	50 deg
0.9	60 deg
1.0	68 deg

2.6 NAVIGATION - OVERVIEW

Pilot Cockpit Interface	
· **HUD**	**H**eads **U**p **D**isplay · Displays WRITE ME information
· **VDI**	**V**ertical **D**isplay **I**ndicator · placeholder
· **HSD**	**H**orizontal **S**ituation **D**isplay · **NAV Mode** Information – **Diamond** – Current heading – **Chevron** – **TACAN TO** bearing – **+** – **TACAN FROM** bearing – **House** – **ADF** bearing – **RNG** – Range to Waypoint (nm) – **MODE** – **NAV STEER** mode – **W** – Wind heading / speed (kts) – **TAS** – **T**rue **A**ir**S**peed (kts) – **GS** – **G**round**S**peed (kts) · **TID Mode** Information – Overhead View – Waypoint Coordinates
· **BDHI**	· placeholder
· **Standby Magnetic Compass**	· placeholder
· **Tacan Control Panel**	· placeholder
· **STEER CMD Selectors**	· placeholder

2.7 NAVIGATION - INS

· **Contributing Subsystems**	· **IMU** – **I**nertial **M**easurement **U**nit – **4 Gimbals** – No gimbal-lock, corrects platform attitude errors – **2 Gyros** – Source for aircraft attitude data – **3 Accelerometers** – Source for aircraft acceleration data · **CSDC** – **C**omputer **S**ignal **D**ata **C**onverter – Processes sensor signals including IMU data
· **CSDC Data Modes**	(a) **INS** – Primary nav mode · **Velocity Data** – IMU · **Pitch/Roll Data** – IMU (b) **IMU/AM** – Backup mode selected by RIO or automatically when CSDC determines IMU velocity data unreliable. · **Velocity Data** – Calculated from true airspeed & stored wind · **Pitch/Roll Data** – IMU (c) **AHRS/AM** – Further degraded mode selected by RIO or automatically when CSDC detects total INS failure · **Heading** – Mag heading & MAG VAR · **Velocity Data** – Calculated from true airspeed & stored wind · **Pitch/Roll Data** – AHRS

2.8 NAVIGATION - ALIGNMENT

· **Ground Align**	(a)
· **Carrier Align D/L**	
· **Carrier Align Handset**	
· **Reinitialization**	
· **Automatic Stored Heading**	
· **Catapult Align**	

2.9 NAVIGATION - WAYPOINT

· **Reference Point Types**	· **Navigation Waypoint** – Used for navigation. Maximum of 3 stored simultaneously · **Fixed Point (FP)** – Arbitrary point to establish current position relative to external references · **Initial Point (IP)** – Starting point for A/G attack run · **Surface Target (ST)** – Enemy surface target · **Defended Point (DP)** – Area to protect (i.e friendly forces) · **Hostile Area (HA)** – Area with known ground or air hostiles · **Home Base (HB)** – Airfield / CV

2.10 NAVIGATION - TACAN

2.11 NAVIGATION - VOR/ADF

2.12 COMMS - OVERVIEW

· **ARC-159 UHF 1**	· **Air-to-Air & Air-to-Surface Communication** · **Pilot Controlled** · **Frequency** – **Range** – 225.000 - 399.975 MHz – **Steps** – 25 kHz – **Channels** – 20
· **ARC-182 V/UHF 2**	· **Air-to-Air & Air-to-Surface Communication** · **RIO Controlled** · **Frequency** – **Band 1** – 30 - 88 MHz – **Band 2** – 108 - 156 MHz – **Band 3** – 156 - 174 MHz – **Band 4** – 225 - 399.975 MHz – **Steps** – 25 kHz – **Channels** – 20
· **ARA-50 UHF ADF**	· **UHF Automatic Direction Finder** · **LoS bearing to UHF Transmitter** · **Bearing displayed on BDHI, Pilot HSD** · **5 min Warmup**
· **KY-28 Voice Security Equipment**	· **Voice Ciphering** · **Integrated with UHF 1 and V/UHF 2** · **2 min Warmup**

2.13 COMMS - ARC-159 UHF 1

· **ARC-159 UHF 1**	· **Air-to-Air & Air-to-Surface Communication** · **Pilot Controlled** · **Frequency** – **Range** – 225.000 - 399.975 MHz – **Steps** – 25 kHz – **Channels** – 20
· **VOL Knob**	· **Controls Pilot UHF 1 Audio Level**
· **BRT/TEST Knob**	· **Controls Radio FREQ Display** · Turn past max to display **888.888**
· **SQL Switch**	· **Toggles radio squelch (noise attenuation)**

· READ Switch	· Displays Frequency of Selected Preset Channel
· LOAD Button	· Saves Displayed Frequency to Selected Preset Channel
· TONE Button	· Steady 1.020 kHz Test Tone
· Mode Selector	· Frequency Selection Method – **GUARD** – 243.000 MHz – **MANUAL** – Manual tuning – **PRESET** – Preset channels
· Function Selector	· Selects Transceivers to Energize – **ADF** – Not simulated – **BOTH** – Main & Guard – **MAIN** – Main – **OFF** – Secures UHF 1 radio
· CHAN SEL	· Selects from 20 preset Channels

2.14 COMMS - ARC-182 V/UHF 2

· ARC-182 V/UHF 2	· Air-to-Air & Air-to-Surface Communication · RIO Controlled · Frequency – **Band 1** – 30 - 88 MHz – **Band 2** – 108 - 156 MHz – **Band 3** – 156 - 174 MHz – **Band 4** – 225 - 399.975 MHz – **Steps** – 25 kHz – **Channels** – 20
· VOL Knob	· Controls RIO UHF 2 Audio Level
· BRT/TEST Knob	· Controls Radio FREQ Display
· SQL Switch	· Toggles radio squelch (noise attenuation)

Mode Selector	**Transceiver Settings** – **OFF** – Secures V/UHF radio unless frequency mode set to **243** – **T/R** – Energizes transmitter and main receiver – **T/R & G** – Energizes transmitter, main, and guard receiver – **DF** – Automatic direction finding from 108 - 399.975 MHz – **TEST** – BIT
CHAN SEL Outer Dial	**Selects Frequency Tuning Mode** – **243** – Selects UHF Guard – **MAN** – Manual Select frequency – **G** – Tunes Tranceiver to guard frequecy in last selected band – **PRESET** – Allows selection between 40 preset channels (31-40 are Have Quick and not simulated) – **READ** – Displays frequency of selected preset channel – **LOAD** – Saves displayed frequency to selected preset channel
CHAN SEL Inner Dial	**Selects one of 40 Preset Channels**

2.15 COMMS - KY-28 VOICE SECURITY EQUIPMENT

KY-28 Voice Security Equipment	**Voice Ciphering** **Integrated with UHF 1 and V/UHF 2** **2 min Warmup**
ZEROIZE Switch	**Lift Guard to Erase Preloaded Codes** Codes loaded via ground crew
Power-Mode Switch	**Selects Mode** – **P/OFF** – Removes power from system – **C** – Transmit / Receive in secure mode – **DELAY** – Between PTT and trans.

· **Radio-Select Switch**	· **Selects Radio Mode** – **RELAY** – Acts as relay for other stations (not simulated) – **RAD-2** – Secure voice for V/UHF 2 – **RAD-1** – Secure voice for UHF 1

2.16 LINK 4 DATALINK - OVERVIEW

· **Link 4**	· **Modes** – Mutually exclusive – **Link 4A** – AWACS / Surface Ship – **Link 4C** – Fighter to Fighter · **Data Speed** – up to 5000 bit/s!
· **Link 4A**	· **Network** – AWACS / Surface Ship · Additionally used for ACLS
· **Link 4C**	· **Network** – Fighter to Fighter – Up to four F-14s – Unique to F-14
· **Basic Operation**	(a) **Power Switch** ..... As Desired · **Link 4A** ..... **ON** · **Link 4C** ..... **AUX** (b) **Mode Switch** ..... **TAC** (c) **Frequency** ..... **Set**

2.17 LINK 4 DATALINK - CONTROL PANEL

· **Test Switch**	· **Controls Test / Anti-Jam Modes** – **TEST** – Initiates BIT – **NORM** – Normal Operation – **A-J** – Anti-Jam (not simulated)
· **Frequency Thumbwheels**	· **Selects Datalink Frequency** – **First Digit** – **Fixed as 3** – **Allowable Range** – 300.0 - 324.9 MHz
· **Power Switch**	· **Controls System Power** – **ON** – Enables Link 4A – **OFF** – Disables system – **AUX** – Enables Link 4C

2.18 LINK 4 DATALINK - REPLY/ANTENNA PANEL

· **ANTENNA Switch**	· **Selects Antenna** – **Shared with UHF 1** – Mutually exclusive – **UHF 1 LWR / DL UPR** – **UHF 1 UPR / DL LWR**
· **REPLY Switch**	· **Sets Reply Mode** – **NORM** – Own Aircraft replies to datalink messages – **CANC** – Receive only
· **MODE Switch**	· **Controls Overall Mode** – **TAC** – Normal airborne mode – **CAINS/WAYPT** – Enables CV align
· **Address Thumbwheels**	· **Sets Two Least Significant Bits of Aircraft D/L Address**

2.19 ALR-67 RWR - CONTROLS / OVERVIEW

· **PWR Switch**	· **Set to ON to Operate**
· **VOL Knob**	· **Sets RIO Audio Level**
· **TEST Switch**	· **Springloaded to Center** · **BIT** – Initiates Build In Test · **SPL** – Holds BIT status page while held
· **MODE Switch**	· **Springloaded to Center** · **OFST** – Separates overlapping symbols · **LMT** – Displays 6 highest threats
· **DISPLAY TYPE Selector**	· **Changes Priority of Display** – **NORM** – Normal threat symbology – **AI** – Airborne Interceptor prioritized – **AAA** – Anti-aircraft artillery prioritized – **UNK** – Unknown prioritized – **FRIEND** – Friendly threats prioritized · **Indicated by Letter in Display Center**
· **Display**	· **Outer Band** – **Critical Band** – Imminent threat to own aircraft – Blinking indicates engaging own aircraft · **Middle Band** – **Lethal Band** – Potentially threatening emitters – Not actively engaging own aircraft · **Inner Band** – **Non-Lethal Band** – Not currently within capability of emitter · **Inner Circle** – **N, I, A, U, F** – Prioritization type – **O** – Offset – **L** – Limit – **B** – BIT Failure – **T** – Thermal overload

· **Alert Tones**	· **Short Tone** – New emitter / emitter moved · **Slow Warbling** – Threat in critical band · **Fast Warbling** – Threat actively engaging own aircraft · **4-Tone Sequence** – New threat capable of silently engaging own aircraft

2.20 ALR-67 RWR - THREAT SYMBOLOGY

SHIPS	
AB	Arleigh Burke
AK	Admiral Kuznetsov
GR	Grisha 5 (Albatros)
HP	Oliver Hazard Perry
J2	Type 054A Frigate, "Jiangkai II class"
KK	Krivak 3 (Rezky)
KV	Kirov (Pyotr Velikiy)
L1	Type 052B Destroyer, "Luyang I class"
L2	Type 052C Destroyer, "Luyang II class"
N	*Ship with Nav Radar*
NE	Neustrashimy
NZ	Nimitz (Vinson, Stennis)
SV	Slava (Moscow)
TC	Ticonderoga
TT	Tarantul 3 (Molniya)
TW	Tarawa
YU	Type 071 Amphibious Transport Dock, "Yuzhao class"

AIRCRAFT	
14	F-14A/B
15	F-15C/E
16	F-16C
17	JF-17
18	F/A-18C
19	MiG-19
21	MiG-21bis
23	MiG-23MLD
24	Su-24M/MR
25	MiG-25PD
29	MiG-29A/G/S Su-27 Su-33 J-11A
30	Su-30
31	MiG-31
34	Su-34
37	AJS-37
39	Su-25TM
50	A-50
52	B-52
AN	AN-26B AN-30M
AP	AH-64D
B1	B-1B
BE	Tu-95 Tu-142M
BF	Tu-22M3
BJ	Tu-160
E2	E-2D
E3	E-3C
F4	F-4E
F5	F-5E
HX	Ka-27
IL	IL-76MD IL-78M
KC	KC-135

KJ	KJ-2000
M2	Mirage 2000-C Mirage 2000-5
S3	S-3B
SH	SH-60B
TO	Tornado
TR	C-130 C-17A

AIR DEFENSE

2	S-75 TR SNR (SA-2) "Fan Song"
3	S-125 TR SNR-125 (SA-3) "Low Blow"
6	Kub SA-6
7	HQ-7 TR
8	OSA (SA-8)
10	S-300PS 30N6 TR (SA-10)
11	Buk (SA-11)
12	S-300V
15	Tor 9A331 (SA-15)
19	Tunguska 2C6M (SA-19)
A	Gepard M-163 Vulcan ZSU-23-4 Shilka
BB	S-300PS 64H6E SR (SA-10/Big Bird)
BF	Rapier Blindfire TR
CS	S-300PS 5N66M SR (SA-10/Clam Shell)
DE	Sborka (Dog Ear)
FF	S-125 P-19 SR (SA-3/Flat Face)
GR	Roland SR
HA	Hawk SR
HK	Hawk TR
HQ	HQ-7 SR
PT	Patriot
RO	Roland
RP	Rapier SR
S	1L13 55G6 EWR
SD	Buk TR (SA-11/Snow Drift)
SN	PRW-11 (Side Net)

MISSILES

M	AIM-54 AIM-120 MICA-EM R-37 R-77 SD-10

ATC

T	Airport ATC Radar

2.21 ALE-39 CMS DISPENSER

	Programmer
· **CHAFF Section**	· **B QTY** – Number of cartridges to eject in burst – **Options** – **1-4** cartridges, **C** continuous, **R** random (4-6 cartridges) · **B INTV** – Time in seconds between each cartridge ejection – **Options** – **.1, .2, .5, .7, 1** seconds, **R** random · **S QTY** – How many salvos of bursts – **Options** – **1, 2, 4, 6, 8, 10, 15** salvos · **S INT** – Time in seconds between salvos – **Options** – **2, 4, 6, 8, 10** seconds
WARNING **R** & **C** burst settings have special **INTV** behavior	
· **JAMMER Section**	Jammer cartridges not implemented in DCS
· **FLARE Section**	· **QTY** – Number of cartridges to eject in burst – **Options** – **2, 3, 4, 6, 8, 10** cartridges · **INTV** – Time in seconds between each cartridge ejection – **Options** – **2, 4, 6, 8, 10** seconds
	Control Panel
· **PWR/MODE Switch**	· **AUTO (CHAFF) / MAN** – Enables power to system and allows automatic chaff ejection program initiation · **MAN** – Enables power to system · **OFF** – Disables system

2.22 ALQ-100 / ALQ-126 DECM

3 AWG-9 RADAR

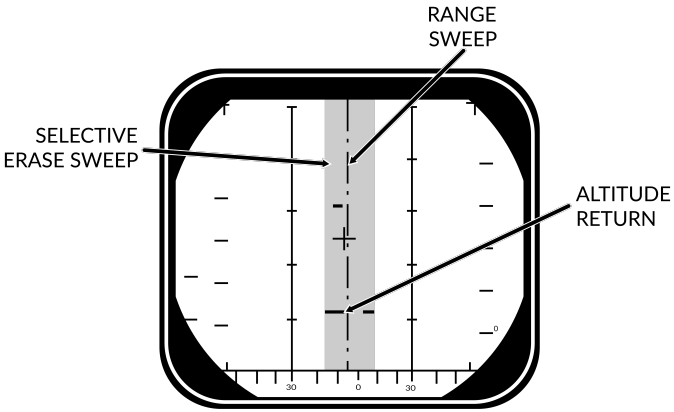
3.1 MAIN MODES - OVERVIEW

	Pulse		Pulse Doppler			
	Pulse Search	**P-STT**	**PD Search**	**RWS**	**TWS**	**PD-STT**
Range	60 nm	50 nm	110 nm	90 nm	90 nm	90 nm
AIM-7	BRSIT	CW	BRSIT		-	PD
AIM-54	BRSIT	ACT	BRSIT		Multi TGT	PD/ACT

3.2 MAIN MODES

- **Pulse**
  - **Basic Pulse w/o doppler filtering**
    - Cannot be notched
    - Ground Clutter
    - Rudimentary Ground mapping
  - **Pulse Sub-Modes**
    - **Pulse Search**
    - **Pulse-STT**
- **Pulse Doppler**
  - **Doppler filter --> no ground returns**
    - Susceptible to notching
    - No ground clutter
    - Greater range
    - Advanced sub modes
    - AIM-54 Guidance
  - **Pulse Doppler Sub-Modes**
    - **PD Search**
    - **RWS**
    - **TWS**
    - **PD-STT**

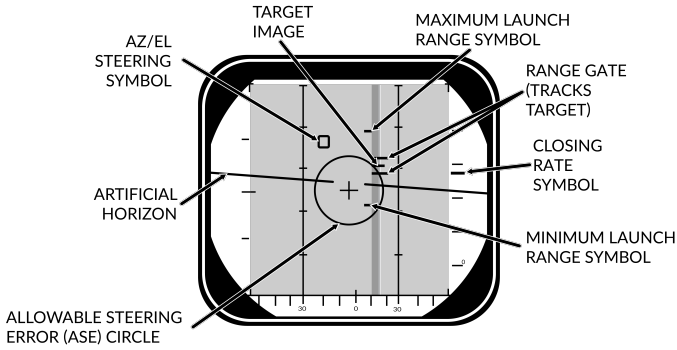
3.3 PULSE MODE - PULSE SEARCH



SEARCH (±10° SCAN)

· **Pulse Search**	**Basic Mode** - AWG-9 does not use pulse doppler filtering · **Advantages** – All aspect target detection – Cannot be notched – Rudimentary ground mapping · **Disadvantages** – Cannot discern ground returns and targets – Lower range
· **DDD**	· **Range/Azimuth** · Visual representation of radar and erase sweeps
· **TID**	· **No Information from Pulse** · **Cannot guide AIM-54**

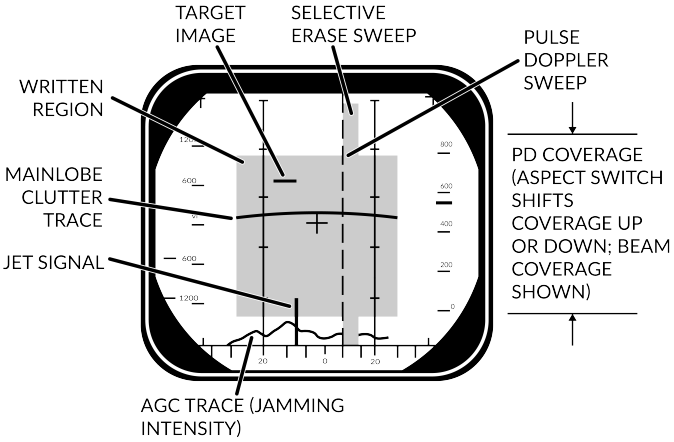
3.4 PULSE MODE - PSTT



SINGLE TARGET TRACK

· **Pulse STT**	Lock Target w/o doppler filtering · **Advantages** – Cannot be notched · **Disadvantages** – Susceptible to ground clutter
· **Lock Target**	· **Conditions** – Pulse Search Mode selected – RDR HCU Mode selected · **Lock Target** (a) Hold HCU Half-action (b) Slew to desired Target (c) HCU Full-Action to lock · **Unlock Target** (d) HCU Half-action
· **DDD**	· **Track Indications** – ANT TRK light – RDROT light – Tracking gates – Closure rate – Attack Symbology

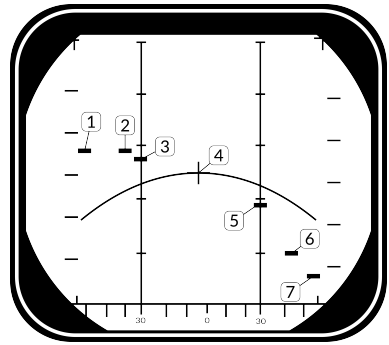
3.5 PULSE DOPPLER MODE - PULSE DOPPLER SEARCH



SEARCH (±40° SCAN)

· **Pulse Doppler Search**	**``Early Warning'' Mode** - Longest Range, cannot display range · **Advantages** – Longest Range – Doppler Filtering – **``Look Down Shoot Down''** · **Disadvantages** – Can be notched – No range information
· **DDD**	· **Closure Rate/Azimuth** · Visual representation of radar and erase sweeps
· **Doppler Filters**	· **Main Lobe Clutter (MLC) Filter** – **Own GS +/- 133 knots** – Removes main ground return – Source of notching · **Zero Doppler Filter** – **Negative own GS +/- 100 knots** – Removes Radar reflection from ground directly beneath own AC

· **MLC Switch**	· **IN:** Enables MLC filter · **AUTO:** Enables MLC filter if look-up angle less than 3 deg · **OUT:** Disables MLC filter
· **Vc Switch**	Changes closure rate DDD scale · **X-4:** -800 to 4000 knots · **NORM:** -200 to 1000 knots · **VID:** -50 to 250 knots
· **ASPECT Switch**	Changes closure rate processing scale · **NOSE:** -600 to 1800 knots · **BEAM:** -1200 to 1200 knots · **TAIL:** -1800 to 600 knots



	Look Angle	Line of Sight Rate	Target Heading
1	60 deg	1490	180 deg
2	45 deg	1500	120 deg
3	30 deg	1428	100 deg
4	0 deg	1200	90 deg
5	30 deg	672	80 deg
6	45 deg	210	60 deg
7	60 deg	-300	0 deg

3.6 PULSE DOPPLER MODE - RWS

· **Range While Search**	**FM Ranging**, used for getting good A/A picture before selecting TWS · **FM Ranging** – Pulse Doppler with ranging – TID shows momentary tracks with ranges – Processing reduces max range · **Advantages** – Long Range – Doppler Filtering – **``Look Down Shoot Down''** – Signal Processing · **Disadvantages** – Can be notched
· **DDD**	· **Closure Rate/Azimuth** · Visual representation of radar and erase sweeps
· **TID**	· **Momentary Tracks** · Max concurrent tracks: 48 · **Cannot lock targets from TID**
· **Filtering**	**Same as Pulse Doppler Search**

3.7 PULSE DOPPLER MODE - TWS

· **Track While Scan**	**Builds Track Files**, high situational awareness, multi-target AIM-54 launch · **Track Files** – AWG-9 builds Trackfiles for contacts – Can launch multiple AIM-54 – Processing reduces max range – Can lock targets from TID · **FM Ranging** – Pulse Doppler with ranging – TID shows momentary tracks with ranges – Processing reduces max range · **Advantages** – Doppler Filtering – **Multi-Target AIM-54** · **Disadvantages** – **Lowest Range** – Can be notched
· **DDD**	· **Closure Rate/Azimuth** · Visual representation of radar and erase sweeps
· **TID**	· **Tracksfiles** · Max concurrent tracks: 24 · Max displayed tracks: 18
· **Filtering**	**Same as Pulse Doppler Search**
· **Scan Volume**	Trackfiles require update every 2.5 s –> · 20 deg 4 bar (if selected) · 40 deg 2 bar (else)
· **TID Mode Selector**	· **GND STAB:** Ground Stabilized, True North is up on TID · **A/C STAB:** Aircraft Stabilized · **ATTAK:** same as A/C STAB with superimposed attack steering symbology · **TV:** Displays TCS on TID, dispays LANTIRN on TID if equipped

TID Display Selector Buttons	· **RID DISABLE:** Not simulated · **ALT NUM:** Enables display of track altitudes on left side of track symbols · **SYM ELEM:** Enables display of all supplementary symbology of tracks and waypoints · **DATA LINK:** Enables display of D/L contacts · **JAM STROBE:** Enables display of jam strobes · **NON-ATTK:** enables/disables display of targets not possible to engage (friendlies) · **LAUNCH ZONE:** Enables display of weapon launch zones · **VEL VECTOR:** Enables display of velocity vectors
TRACK HOLD CLSN Steering Buttons	· **TRACK HOLD** – Normally: Tracks maintained for 14 s after last observation – Track Hold: maintained for 2 min after last observation · **CLSN Button** – begins collision steering to currently tracked target – enables Steering Centroid if in TWS – LD CLSN presents azimuth steering only – CLSN presents both azimuth and elevation steering
TWS AUTO / MAN	· **TWS MAN:** Manual azimuth/elevation control, target designation by RIO · **TWS AUTO:** Automatic prioritization of targets and azimuth elevation control

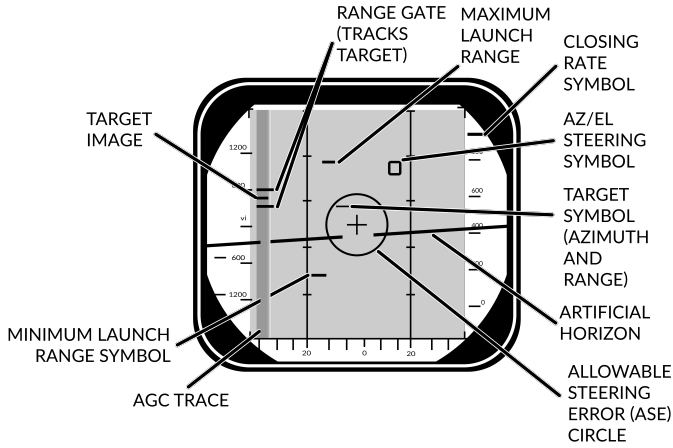
3.8 PULSE DOPPLER MODE - TWS MAN

· **TWS MAN**	· **Target Selection:** Manual · **Scan Azimuth/Elevation:** Manual
· **Target Selection**	· **Conditions** – TWS MAN Radar Mode selected – TID CURSOR TID Mode selected · **Hook Target** (a) Hold HCU Half-Action (b) Slew TID Cursor over desired Tgt (c) HCU Full-Action to select Tgt · **TID Symbology** – Range (**RA**) – Bearing (**BR**) – Altitude (**AL**) – Magnetic course (**MC**) · **Lock Target** (d) Press **PD STT** or **Pulse STT** buttons · **Deselect Target** (e) press HCU Half-Action
· **AIM-54 Launch**	· **Automatically selects TWS AUTO** · **Prevents selection of TWS MAN**

3.9 PULSE DOPPLER MODE - TWS AUTO

· **TWS AUTO**	· **Target Selection:** prioritizes contacts based off range, aspect, closure · **Scan Azimuth/Elevation:** Geometric center of targets in scan volume
· **Centroid / Steering Cues**	· **Steering Centroid** – facilitates steering cues – HUD, VDI, TID, DDD – Appears as **X** on TID – Takes Gimbal limits into account – Weights individual Tracks based on parameters · **Illumination Centroid** – **Not Visible** – Controls azimuth and elevation of scan pattern – Takes scan volume into account
· **Pilot Steering Cues**	· **Conditions** – A-A HUD Mode selected – Master Arm ON (UP) – AIM-54 or AIM-7 selected – TWS-AUTO selected

3.10 PULSE DOPPLER MODE - PDSTT



SINGLE TARGET TRACK

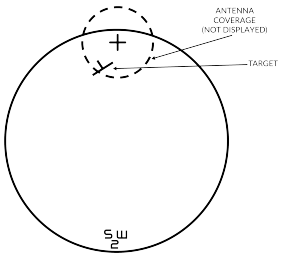
· **Pulse Doppler STT**	Lock Target with doppler filtering · **Advantages** – Ground Clutter filtering · **Disadvantages** – Susceptible to notching
· **Lock Target**	· **Conditions** – Pulse Doppler Mode selected (PD Search, RWS, TWS) – RDR HCU Mode selected · **Lock Target** (a) Hold HCU Half-action (b) Slew to desired Target (c) HCU Full-Action to lock · **Unlock Target** (d) HCU Half-action
· **DDD**	· **Track Indications** – ANT TRK light – RDROT light – Tracking gates – Closure rate – Attack Symbology

3.11 ACM MODES - OVERVIEW

	PLM	VSL	PAL	MRL
Range	5 nm	5 nm	15 nm	5 nm
Description	Boresight	Vertical	Horizontal	RIO
Weapons	Gun + All Missiles			

· PLM

- **Pilot Lockon Mode**
- **Highest Priority ACM**
- **Search Pattern**
  - Small Boresight
  - Range: 5 nm



· VSL

- **Vertical Scan Lockon**
- **HI Search Pattern**
  - Width: 5 deg
  - Vertical: +15 to +55 deg
  - Range: 5 nm
- **LO Search Pattern**
  - Width: 5 deg
  - Vertical: -15 to +25 deg
  - Range: 5 nm
- **RIO/PILOT Controlled**

· PAL

- **Pilot Automatic Lockon**
- **Search Pattern**
  - Width: +/- 20 deg
  - Vertical: 8-bar
  - Range: 15 nm

· MRL

- **Manual Rapid Lockon**
- **RIO Controlled**
- **Search Pattern**
  - HCU Controlled
  - Range: 5 nm

3.12 APX-76 IFF

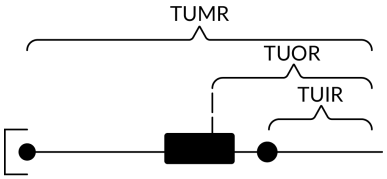
3.13 TID SYMBOLOGY

GENERAL		
Center Dot		· **Basic Component of Symbols** – Marks coordinates of symbol
Own AC		· **Symbol representing own aircraft** – Ground Stabilized: Moves – Aircraft Stabilized: Stationary – Outside TID: line drawn from TID center towards symbol
TID Cursor		· **Hook Cursor** – Controlled by **HCU** in **TID mode** · **Half-Action** – Enables display of symbol – Enables HCU stick to move cursor · **Full-Action** – Hooks closest symbol – If no symbol near, cursor dropped at location
TWS Steering Centroid		· **Steering centroid of TWS tracks** – Selected by WCS for weapons engagement
ONBOARD SENSORS		**Symbol Above Dot**
Unknown		· **Unknown Sensor Track** · **All Returns in RWS**
Hostile		· **Sensor Track designated Hostile by RIO**
Friend		· **Sensor Track designated Friendly by RIO**
Angle-Tracked Radar Target		· **Radar Angle Tracking** – Jamming Target

Angle-Tracked Radar Target with Altitude Difference Ranging		· **Radar Angle Tracking** – Jamming Target – Alt. diff. ranging
TCS-Angle Tracked Target		· **TCS Angle Tracking**
TCS-Angle Tracked Target with Altitude Difference Ranging		· **TCS Angle Tracking** – Alt. diff. ranging
D/L TARGETS		**Symbol Below Dot**
Unknown		· **D/L Track designated Unknown by Source**
Hostile		· **D/L Track designated Hostile by Source**
Friendly		· **D/L Track designated Friendly by Source**
MANUAL REF POINTS		
Home base		· **Waypoint Representing** – Home Base – Carrier – Airfield
Waypoint		· **Nav Waypoint** · **Supplanted by Number** – 1, 2, or 3
Defended Point		· **Waypoint to Defend**
Fixed Point		· **Generic Waypoint**
Hostile Area		· **Waypoint Indicating Hostile Area**
Surface Target		· **Waypoint Indicating Surface Target**
IP		· **Initial Point** – Waypoint for A/G engagement
D/L REF POINTS		

Home Base		· **D/L Waypoint Representing Home Base**
Waypoint		· **D/L Generic Waypoint**
Data Link Fixed Point		· **D/L Waypoint Representing Fixed Point**
Surface Target		· **D/L Waypoint Representing a Surface Target**
POS SYMB MODIFIERS		
Mandatory Attack		· **Additional Symbology on TWS Track** – Horizontal bar through center dot · **Selected by RIO** – Only 1 target can be designated – Guaranteed WCS priority number
Data Link Destroy		· **Additional Symbology on D/L Track** – Horizontal bar through center dot · **Selected by Source** – No effect on WCS prioritization
Do Not Attack		· **Additional Symbology on TWS or D/L Track** – Vertical bar through center dot · **If Set by RIO** – Removes WCS prioritization
Multiple Targets		· **Additional Symbology on TWS or D/L Track** – Horizontal bar on left side of symbol · **Indicates Multiple Targets**

Data Link Challenge		· **Additional Symbology on D/L Track** — Small **V** with center at center dot · **Command to Visually Identify**
Track Extrapolated		· **Additional Symbology on TWS or D/L Track** — Small **X** with center at center dot · **No Update within 8 seconds** — Track deleted after 14 seconds — Or after 2 min if track hold
Altitude Numerics		· **Altitude to Nearest Ten Thousand** — example: 35000-45000
Firing Order Numerics		· **Indicates AIM-54 Prioritization** — Numbers 1-6 — Only in TWS
Time-to-Impact (TTI)		· **After AIM-54 Launch** — Prioritization replaced with estimated TTI · **Flashes after Pitbull**
Velocity Vector		· **Additional Symbology from center Dot** — Direction represents track heading — Length represents speed · **Varies with Mode** — Ground Stabilized: true heading and ground speed — Aircraft Stabilized: relative heading and velocity

Launch Zone Vectors		 · **Additional Symbology for AIM-54** – Selected manually by RIO – Or 60 seconds from max launch · **TUMR** – Time-Until-Minimum-Range – Max: 180 seconds, 1.5 inches · **TUOR** – Time-Until-Optimal-Range – Start of bar is 8 seconds from optimum · **TUIR** – Time-Until-In-Range
Jamming Strobe		· **Line from own AC towards Jammer**
Radar Antenna Scan Pattern Azimuth Limits		· **Limits of Current Scan Azimuth** · **Single Line in STT**
Data Link Jamming Strobe		· **Line from D/L point towards Jammer**
Data Link Pointer		· **Additional Symbology on D/L Track** – Circle – Indicates operator concern
Data Link Priority Kill		· **Additional Symbology on D/L Track** – Square – Indicates target must be destroyed – No effect on WCS prioritization

ATTACK DISPLAY SYMBOLOGY

Artificial Horizon		· **Represents Pitch and Roll**
Steering Guidance Symbol		· **Represents Steering Error** – Should be placed as near as possible to center of ASE circle
Allowable Steering Error Circle		· **Indicates Allowable Steering Error for Missile Launch** · **Size Varies with Geometry, Mode, Missile**
Breakaway Indication		· **Appears when Target Range Less than Minimum for Selected Weapon**

4 TCS

4.1 OVERVIEW

5 LANTIRN

5.1 OVERVIEW

· **LANTIRN**	**L**ow **A**ltitude **N**avigation and **T**argeting **I**nfra-**R**ed for **N**ight · **Only Targeting Pod** – Nav pod was deleted · **Incomplete Integration** – Own control panel, supplants TCS feed
· **Master Modes**	· **A/G** – Allows bomb release guidance · **A/A** – Optimized for air targets
· **FOV Levels Overview**	· **Wide** – **FOV** – 5.9 deg – **Slew** – 8.5 deg/s · **Narrow** – **FOV** – 1.7 deg – **Slew** – 1.8 deg/s · **Expanded** – **FOV** – 0.8 deg – **Slew** – 0.7 deg/s – **Digital Zoom** – Degraded quality

5.2 OVERVIEW - STARTUP

1.	**Power Switch**	**POD**
2.	**Pod Startup Sequence**	· 8 min startup sequence · **MODE Switch** shows **STBY** when complete
3.	**MODE Switch**	**Press**
4.	**Initialization Sequence**	· 30 sec initialization · **MODE Switch** shows **OPER** when ready
5.	**VIDEO Switch**	**FLIR**
6.	**TID MODE**	**TV**

5.3 OVERVIEW - POINTING MODES

· **Sensor Modes Overview**	· **Contrast Lock** – **Area Track** – **Point Track** · **Q Designation** – **Directional Q** – QSNO / QADL / QHUD – **Location Q** – QWp / QDES
· **Directional Q**	· **Do Not Allow Weapon Guidance** · **QSNO** – Pod slaved to **ground 15 nm in front** along own aircraft heading · **QADL** – **Pod slaved to ADL** – In A/A mode · **QHUD** – **Pod slaved to HUD** – In A/G mode
· **Location Q**	· **Allow Weapon Guidance** · **QWp** – Pod slaved to WCS waypoint – Cycled with **QWp+** / **QWp-** · **QDES** – **Designate targets for engagement** – **LANTIRN Trigger Second Detent** to designate – Coordinates can be manually added to WCS for navigation

5.4 OVERVIEW - LASING/DESIGNATION

· **A/G Designation**	(a) **Designate** ..... **Trigger Full-Action** · Laser Fires · Slant Range calculated · Time-to-Go calculated
· **Steering Cues**	· **Automatically activated when QDES selected/designated** · QDES remains even if new Q selected · Cues still point towards QDES even if pod at another point
· **Manual Lase**	(a) **Lase** ..... **Trigger Half-Action Hold**
· **Latched Lase**	· **Effect** – Lases for 60 sec (a) **Activate** ..... **Latch Lase Button Press** (b) **Extend** ..... **Latch Lase Button Press** (c) **Deactivate** ..... **Trigger Half-Action**
· **Auto Lase**	· **Effect** – Fires from -10 to +4 sec TIMP (a) **Laser Mode** ..... **Slider AFT Short** (b) **Cycle A/M** ..... **Right 4-Way Depress**
· **Laser Notes**	· **Always at current Pod location** · Can point to different location than QDES

5.5 CONTROLS - PANEL

· **Power Switch**	· **OFF** – Disables power to system · **IMU** – Only powers LANTIRN IMU **(Not Simulated in DCS)** · **POD** – Powers whole system
· **MODE Switch**	· **STBY** – Standby · **OPER** – Operational
· **LASER Switch**	· **ARM** – Arms laser · **SAFE** – Inhibits laser use
· **VIDEO Switch**	· **FLIR** – Displays LANTIRN FLIR on TID · **TCS** – Displays TCS video on TID
· **Indicator Light**	· **Indicate Error States**

· IBIT Button	· Initiates Build-In-Test

5.6 CONTROLS - STICK

· Master Mode	· A/G Mode – Side 2-Way FWD · A/A Mode – Side 2-Way AFT
· Slew	Center Slew Hat
· WHOT/BHOT	Center Slew Hat Depress
· Contrast Track	· Point Track – Left 4-Way Up · Area Track – Left 4-Way Down
· Q Select	· QADL/QHUD – Right 4-Way Up · QDES – Right 4-Way Right · QSNO – Right 4-Way Down
· Declutter	Right 4-Way Depress
· Zoom Level	FOV Button
· Cycle Gain Control Mode	Slider FWD short
· Manual Gain Control	(a) Slider ..... FWD long (b) Gain ..... Right 4-Way Up/Down Level ..... Right 4-Way Left/Right
· Laser Code	(a) Slider ..... AFT short (b) Select Digit ..... Right 4-Way Left/Right (c) Change Digit ..... Right 4-Way Up/Down
· Focus Control	(a) Slider ..... AFT hold (b) Right 4-Way ..... Up/Down
· Manual Lase	Trigger Half-Action
· Latched Laser	Latched Laser Fire Button
· Designate QDES	Trigger Full-Action

5.7 DISPLAY

· **Top Left**	· **Own Aircraft Datablock** – **Lat** – deg:min.dec – **Long** – deg:min.dec – **ALT** – Altitude (ft) – **KGS** – Knots Ground Speed – **DIVE** – Dive Angle (deg)
· **Mid Left**	· **Sensor Mode** – **WHOT** / **BHOT** · **Gain Control** – **Auto** / **Manual**
· **Bottom Left**	· **Pod Info Datablock** – **SRA** – Slant Range – **AZ** – Pod LoS Azimuth L/R – **EL** – Pod LoS Elevation – **Time** – UTC Time – **IBIT** – Codes
· **Bottom Center**	· **Master Mode** – **A/A** / **A/G** · **Track Mode** – **AREA** / **POINT** / **Q** · **Current Weapon** · **Laser Code** · **L** – **Steady** – Laser Armed – **Flashing** – Laser Firing
· **Bottom Right**	· **Q Datablock** – **TTG** – Time-To-Go – **B/R** – Bearing and Range – **ELEV** – Elevation (ft) of Q – **Lat** – deg:min:dec – **Long** – deg:min:dec
· **Mid Center**	· **Crosshair** – **Bounding Box** – Indicates currently tracked target in point mode – **Zoom Boxes** – Indicates next zoom levels – **FLIR Pointing Cue** – Shows Pod LoS, screen center indicates straight down

· **Mid Right**	· **Bomb Rlease Cue** – Only shown if current Q is **QDES**, with valid weapon selected – **TREL** – Time to release – **TIMP** – Time to Impact (after release)
· **Top Center**	· **Steering Guidance to Q** – Relative bearing L/R to commanded heading

6 A/G WEAPONS

6.1 A/G WEAPON SETTINGS - OVERVIEW

WPN TYPE	**Selects Weapon Type** – Configures WCS for selected weapon – Refer to Kneeboard for list of mounted weapons – Mk-81 / 82 / 83 have both **L** and **H** option refering to high and low drag
DLVY MODE	**STP-SGL** – Single weapon per press **STP-PRS** Single pair per press **RPL-SGL** – QTY of weapons per press **RPL-PRS** – QTY of pairs per press
DLVY OPTNS	**INTERVAL** – Interval in ms **QTY** – Number of stores to be released
MECH FUZE	**NOSE** – Arms nose fuze **SAFE** – Inhibits arming of fuzes **NOSE/TAIL** – Arms both fuzes
ELEC FUZE	**SAFE** – Inhibits electrical bomb fuzing **VT** – Sets air-burst mode at preset burst height for compatible stores **INST** – Sets instantaneous burst mode **DLY 1** – Sets preset time delay 1 **DLY 2** – Sets preset time delay 2
STA SEL	**Selects Stations for Employment/Jettison** – Set to **SEL** to activate a pylon – Stations 1 & 8 should be set to **B** for selection – Station 1 & 8 **SW** was used for Sidewinder jettison, is now inoperable
TANK JETT	**Allows Drop Tank Jettison**
SEL JETT	**JETT** – Selective jettison **SAFE** – Inhibits jettison **AUX** – Backup mode
JETT OPTIONS	**MER TER** – Jettisons ejector racks **WPNS** – Jettisons weapons only

·	**ATTK MODE**	· **CCMPTR TGT** — **Computer Target** – Similar to CCRP · **CMPTR IP** — **Computer initial point** — Extended **CMPTR TGT** mode using known IP — For use when target hard to spot visually but close to landmark · **CMPTR PLT** — **Computer Pilot** – similar to CCIP · **MAN** — **Manual** – HUD displays pipper — Backup mode · **D/L BOMB** — **Data-Link Bomb** – Automatic mode steered by D/L cues — **Not Implemented in DCS**

6.2 SELECTIVE ORNANCE JETTISON

1.	**Pilot Conditions**	· **MASTER ARM** ..... **ON**
2.	**RIO Conditions**	· **Desired Stations** ..... **Selected** · **JETT OPTIONS** ..... **As Desired**
3.	**Jettison**	(a) **SEL JETT Guard** ..... **Flipped** (b) **SEL JETT Switch** ..... **JETT**

6.3 M61 GUN

1.	**Pilot Conditions**	· **MASTER ARM** ..... **ON** · **HUD** ..... **A/G** · **WEAPON SELECTOR** ..... **GUNS** · **Wing Sweep** ..... **BOMB**
2.	**Employment**	(a) **Dive** ..... 20-30 deg (b) **Pipper** ..... on target (c) **TRIGGER** ..... **FIRE**
·	**Note: TCS**	· TCS slaved to radar impact point · Rio can select **NAR** or **WIDE**

6.4 FFAR / ZUNI ROCKETS

1.	**RIO Conditions**	· **WPN TYP** ..... **LAU-10** · **Attack Mode** ..... **Pilot Attack** · **Deliver Mode** ..... **RPL-SGL** · **Mechanical Fuze** ..... **NOSE** · **Electronic Fuze** ..... **INST** · **Delivery Options** ..... **As Desired** · **Stations** ..... **Armed**
2.	**Pilot Conditions**	· **MASTER ARM** ..... **ON** · **HUD** ..... **A/G** · **WEAPON SELECTOR** ..... **OFF** · **Stations** ..... verify selected · **Wing Sweep** ..... **BOMB**
3.	**Employment**	(a) **Dive** ..... 20-30 deg (b) **Pipper** ..... on target (c) **TRIGGER** ..... **FIRE**

6.5 UNGUIDED BOMB - CCIP

1.	**RIO Conditions**	· **WPN TYP** ..... **MK-8X** · **Attack Mode** ..... **Pilot Attack** · **Deliver Mode** ..... **STP-PRS** · **Mechanical Fuze** ..... **NOSE** · **Electronic Fuze** ..... **INST** · **Delivery Options** ..... **As Desired** · **Stations** ..... **Armed**
2.	**Pilot Conditions**	· **MASTER ARM** ..... **ON** · **HUD** ..... **A/G** · **WEAPON SELECTOR** ..... **OFF** · **Stations** ..... verify selected · **Wing Sweep** ..... **BOMB**
3.	**Employment**	(a) **Dive** ..... 40 deg (b) **Pipper** ..... on target (c) **STORE RELEASE** ..... **Press and Hold**

6.6 UNGUIDED BOMB - CCRP

1.	**RIO Conditions**	· **WPN TYP** ..... **MK-8X** · **Attack Mode** ..... **Target Attack** · **Deliver Mode** ..... **STP-PRS** · **Mechanical Fuze** ..... **NOSE** · **Electronic Fuze** ..... **INST** · **Delivery Options** ..... **As Desired** · **Stations** ..... **Armed**
2.	**Pilot Conditions**	· **MASTER ARM** ..... **ON** · **HUD** ..... **A/G** · **WEAPON SELECTOR** ..... **OFF** · **Stations** ..... verify selected · **Wing Sweep** ..... **BOMB**
3.	**Designation**	(a) **Slew Diamond** ..... **VSL HI/LO** (b) **Designate** ..... **PAL**
4.	**Employment**	(a) **Flight Path** ..... Straight, Level (b) **Vel Vector** ..... on Bomb Fall Line When Solution Cue meets Velocity Vector (c) **STORE RELEASE** ..... **Press and Hold**

6.7 LASER GUIDED BOMB

1.	**LANTIRN PREP**	(a) **Target Pod Power** ..... **POD** · Warm up takes approx. 8 min · Automatically switches to **STANDBY** (b) **Laser Code** ..... as desired · **MUST BE SET ON THE GROUND** · **Default:** 1688 (c) **LANTIRN Mode** ..... **OPERATE** · **STANDBY** caution will flash for 30 s · Then switches to **OPER** (d) **VIDEO Switch** ..... **FLIR** (e) **TID Mode** ..... **TV**
2.	**RIO Conditions**	· **WPN TYP** ..... **GBU-XX** · **Attack Mode** ..... **Manual** · **Deliver Mode** ..... **STP-SGL** · **Mechanical Fuze** ..... **NOSE** · **Electronic Fuze** ..... **INST** · **Delivery Options** ..... **As Desired** · **Stations** ..... **Armed**
3.	**Pilot Conditions**	· **MASTER ARM** ..... **ON** · **HUD** ..... **A/G** · **WEAPON SELECTOR** ..... **OFF** · **VDI Mode** ..... **TV** · **Stations** ..... verify selected · **Wing Sweep** ..... **BOMB**
4.	**Slew LANTIRN**	**Refer to LANTIRN Control Section** · **Slave to WYPT** ..... **Left-4-Way RIGHT** · **QSNO (Snowplow)** ..... **S4 HAT Down** · **Toggle FOV** ..... **LANTIRN Toggle FOV** · **Slew** ..... **LANTIRN Stick** · **Area Track** ..... **Left-4-Way UP** · **Point Track** ..... **Left-4-Way Down** · **Undesignate** ..... **LANTIRN Undesignate**

4.	**Designate**	**Refer to LANTIRN Designation Section** (a) **Designate** ..... **Trigger Full-Action** · Slant Range calculated · Time-to-Go calculated **Once Time-to-Realease (TREL) is 0** (b) **Auto-Lase** .....If selected: lases 10s to impact (c) **Manual Lase** ..... **Trigger Full-Action** (d) **While Lasing** ..... **L** blinks
5.	**Employment**	**Once Time-to-Realease (TREL) is 0** (a) **STORE RELEASE** ..... **Press and Hold** (b) **Flight Path** ..... Gentle right-hand turn (to prevent masking)

6.8 TALD DECOYS

1.	**RIO Conditions**	· **WPN TYP** ..... **TALD** · **Deliver Mode** ..... **STP-SGL** · **Delivery Options** ..... **As Desired** · **Stations** ..... **Armed**
2.	**Pilot Conditions**	· **MASTER ARM** ..... **ON** · **HUD** ..... **A/G** · **WEAPON SELECTOR** ..... **OFF** · **HSD Mode** ..... **TID** · **Stations** ..... verify selected
3.	**Employment**	(a) **Flight Path** ..... High / Fast (b) **RWR** ..... Monitor to locate emitters (c) **STORE RELEASE** ..... **Press and Hold**

7 A/A WEAPONS

7.1 M61 GUN - OVERVIEW

· **GUN RATE Button**	· **Cycles Gun Rate** – **HIGH** – 6000 rpm – **LOW** – 4000 rpm
· **A/A Gun Modes**	· **RTGS** – **Real-Time Gunsight Mode** – Selected automatically with guns – **If No WCS Data Available** displays bullet location at 2000 ft with diamond and 1000 ft with pipper – **If WCS Data Available** pipper displays bullet location at targets current range out to 4000 ft · **MANUAL** – Fixed manual pipper – Adjust with **GUN ELEV** knob – Press **CAGE/SEAM** to select
· **CAGE/SEAM Button**	· **Cycles RTGS / MANUAL Gun Modes**
· **ROUNDS Knob**	· **Allows selection of remaining gun rounds**

7.2 M61 GUN - MANUAL

1.	**Pilot Conditions**	· **MASTER ARM** ..... **ON** · **HUD** ..... **A/A** · **Gun Rate** ..... **HIGH** · **Gunsight Lead** ..... as required · **WEAPON SELECTOR** ..... **GUNS**
2.	**Employment**	(a) **Gun Mode** ..... **MANUAL** (b) **Pipper** ..... on target (c) **Trigger** ..... **FIRE**

7.3 M61 GUN - RTGS / NO RADAR

1.	**Pilot Conditions**	· **MASTER ARM** ..... **ON** · **HUD** ..... **A/A** · **Gun Rate** ..... **HIGH** · **WEAPON SELECTOR** ..... **GUNS**
2.	**Employment**	(a) **Gun Mode** ..... **RTGS** (b) **Pipper** ..... on target (c) **Trigger** ..... **FIRE**

7.4 M61 GUN - RTGS / RADAR

1.	**Pilot Conditions**	· **MASTER ARM** ..... **ON** · **HUD** ..... **A/A** · **Gun Rate** ..... **HIGH** · **WEAPON SELECTOR** ..... **GUNS**
2.	**Employment**	(a) **Gun Mode** ..... **RTGS** (b) **Radar** ..... **STT** (c) **Pipper** ..... on target (d) **Trigger** ..... **FIRE**

7.5 AIM-9 SIDEWINDER - OVERVIEW

· **Missile Preparation**	· **MSL PREP** – AIM-9 seeker must be cooled – Either press **SW COOL** button – Or activation of **ACM**
· **Seeker Head Modes**	· **SEAM** – **Sidewinder Expanded Acquisition Mode** – **Double-D search pattern** invisible to pilot – 4.5 sec search time – **Allows AIM-9 to be uncaged and track target** – 40 deg track limit – **Allows WCS to slave AIM-9 to radar track** · **Boresight** – AIM-9 locked to ADL – 2.5 deg FOV – Selected if **MODE/STP** set to **BRSIT** – And **ACM** not active
· **MODE/STP Switch**	· **NORM** – Allows **SEAM** seeker mode · **BRSIT** – Forces Boresight seeker mode – Overridden if **ACM** active
· **CAGE/SEAM Button**	· **Uncages Seeker** – Starts 4.5 second double-D search – If no IR source found cages again · **Slaves Seeker** – If radar STT locked

7.6 AIM-9 SIDEWINDER - SILENT

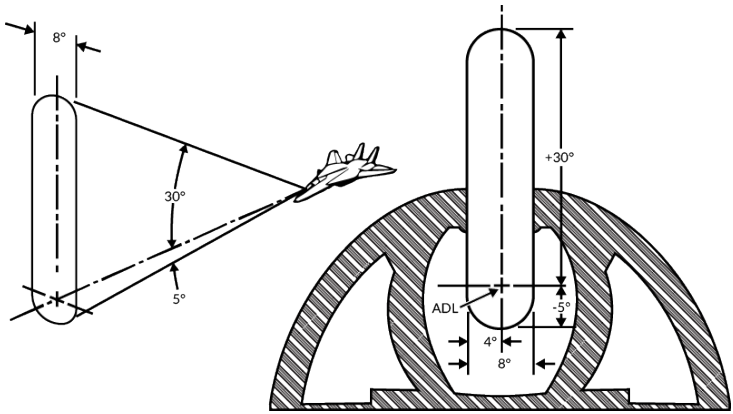
1.	**Pilot Conditions**	· **MASTER ARM** ..... **ON** · **HUD** ..... **A/A** · **SW COOL** ..... **ON** · **MODE/STP** ..... **As Desired** · **WEAPON SELECTOR** ..... **SW**
2.	**Employment**	(a) **CAGE/SEAM** ..... **Uncage Seeker** (b) **IR-Lock** ..... **Good Tone** (c) **Trigger** ..... **FIRE**

7.7 AIM-9 SIDEWINDER - RADAR

1.	**Pilot Conditions**	· **MASTER ARM** ..... **ON** · **HUD** ..... **A/A** · **SW COOL** ..... **ON** · **MODE/STP** ..... **NORM** · **WEAPON SELECTOR** ..... **SW**
2.	**Employment**	(a) **Radar** ..... **STT** (b) **CAGE/SEAM** ..... **Slave Seeker** (c) **IR-LOCK** ..... **Good Tone** (d) **Steering** ..... center T-shaped cue with ASE (e) **Trigger** ..... **FIRE**

7.8 AIM-7 SPARROW - OVERVIEW

· **Missile Preparation**	· **MSL PREP** – AIM-7 must be tuned to AWG-9 – Either press **MSL PREP** button – Or activation of **ACM**
· **Launch Modes**	· **Normal** – Standard operation, STT target designated before launch – AIM-7 uses SARH all the way to target – WCS can use CS or PD for guidance set with **MSL OPTIONS** Switch · **Boresight** – Uses CS flood antenna of AWG-9 – Missile will **track strongest return** in Flood area – Automatically activated if STT broken – Selected if **MODE/STP** set to **BRSIT** – **Or if no STT available** – **Shown Below**
· **MSL SPD GATE Switch**	· **NOSE QTR** – Standard setting in DCS · **All Others** – Not simulated
· **MSL OPTIONS Switch**	· **NORM** – WCS uses dedicated CW antenna for AIM-7 guidance · **SP PD** – WCS uses PD from main flood antenna for AIM-7F/M guidance
· **MODE/STP Switch**	· **NORM** – Sets normal launch mode logic · **BRSIT** – Forces Boresight launch mode



7.9 AIM-7 SPARROW - STT

1.	**Pilot Conditions**	· **MASTER ARM** ..... **ON** · **HUD** ..... **A/A** · **MSL PREP** ..... **ON** · **MODE/STP** ..... **NORM** · **WEAPON SELECTOR** ..... **SP**
2.	**RIO Conditions**	· **MSL SPD GATE** ..... **NOSE QTR** · **MSL OPTIONS** ..... **As Desired**
3.	**Employment**	(a) **Radar** ..... **STT** (b) **Steering** · **Target** < 20 deg from ADL · **ASE** center T-shaped cue within (c) **Trigger** ..... **Press and Hold** (until weapon release) (d) **Radar** ..... **Maintain Lock** (until impact)

7.10 AIM-54 PHOENIX - OVERVIEW

· **Missile Preparation**	· **Weapon Cooling** – AIM-54 requires liquid cooling – RIO enabled **LIQUID COOLING** switch · **MSL PREP** – AIM-54 must be tuned to AWG-9 – Either press **MSL PREP** button – Or activation of **ACM**
· **Launch Modes**	· **PDSTT SARH** – AIM-54 uses SARH all the way to target – Faster update rate than TWS – **Slightly increased effective range** as compared to a TWS launch · **TWS SARH/ARH** – Allows **6 AIM-54 launches at 6 targets** – Missile is initially SARH guided – When within AIM-54 seeker range AWG-9 sends activation command – **Not Fire and Forget:** Requires automatic activation command · **ACM Active** – Activated when **BRSIT** selected – Or when **ACM** active with no radar track – Missile commanded active **before launch**
· **MSL SPD GATE Switch**	· **NOSE QTR** – Standard setting in DCS · **All Others** – Not simulated
· **MSL OPTIONS Switch**	· **NORM** – Normal guidance (SARH or SARH/ARH) · **PH ACT** – WCS immediately sends AIM-54 activation command on launch – Reverts to SARH if no target detected – **Must be selected before launch**

TGTS Switch	· **SMALL** – 6nm activation range · **NORM** – 10nm activation range · **LARGE** – 13nm activation range
Missile Next Launch Button	· **Selects Hooked Track as Next Target for AIM-54 TWS Engagement**
MODE/STP Switch	· **NORM** – Normal operation · **BRSIT** – Commanded active **before launch** – Missile follows ADL and locks strongest return
TWS Symbology	**Refer to TID Symbology Section** · **Pre-Launch** – Prioritization numbers assigned to tracks automatically or manually – Blinking indicates optimal launch parameters · **Post-Launch** – Target prioritization number replaced with TTI – Other prioritization numbers collapsed by one – Tracks under missile attack brightened – **TTI blinks when missile active**
Launch To Eject (LTE) Time	· **Normal Operation** – 3-4 seconds · **When in ACM** – 1 second

7.11 AIM-54 PHOENIX - PD-STT

1.	**Pilot Conditions**	· **MASTER ARM** ..... **ON** · **HUD** ..... **A/A** · **MSL PREP** ..... **ON** · **MODE/STP** ..... **NORM** · **WEAPON SELECTOR** ..... **PH**
2.	**RIO Conditions**	· **LIQUID COOLING** ..... **ON (FWD)** · **MSL SPD GATE** ..... **NOSE QTR** · **MSL OPTIONS** ..... **As Desired** · **TGTS Switch** ..... **As Desired**
3.	**Employment**	(a) **Radar** ..... **STT** (b) **Steering** · **Target** < 20 deg from ADL · **ASE** center T-shaped cue within (c) **Trigger** ..... **Press and Hold** (until weapon release) (d) **Radar** ..... **Maintain Lock** (until impact)

7.12 AIM-54 PHOENIX - TWS / MULTI

1.	**Pilot Conditions**	· **MASTER ARM** ..... **ON** · **HUD** ..... **A/A** · **MSL PREP** ..... **ON** · **MODE/STP** ..... **NORM** · **WEAPON SELECTOR** ..... **PH**
2.	**RIO Conditions**	· **LIQUID COOLING** ..... **ON (FWD)** · **MSL SPD GATE** ..... **NOSE QTR** · **MSL OPTIONS** ..... **As Desired** · **TGTS Switch** ..... **As Desired** · **WCS Mode** ..... **TWS MAN/AUTO**
4.	**Employment**	(a) **Radar** ..... **TWS** (b) **Trigger** ..... **Press and Hold** (until weapon release) (c) **Repeat** ..... for remaining targets (d) **Radar** ..... **Maintain Track** (until active)