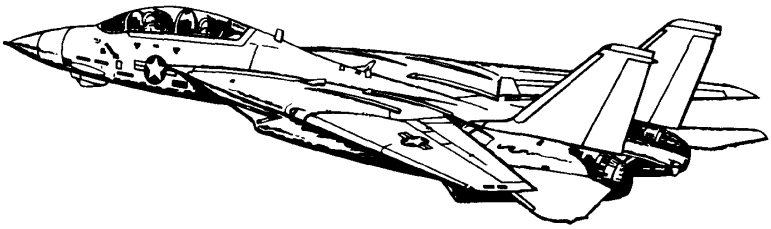
Pocket Checklist

F-14A/B AIRCRAFT

REV: 20220125



Procedures

Systems

AWG-9 Radar

TCS LANTIRN

A/G Weapons

A/A Weapons

Contents

1 PROCEDURES

1.1 PILOT - PRE-START

1.	Parking Brake	**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

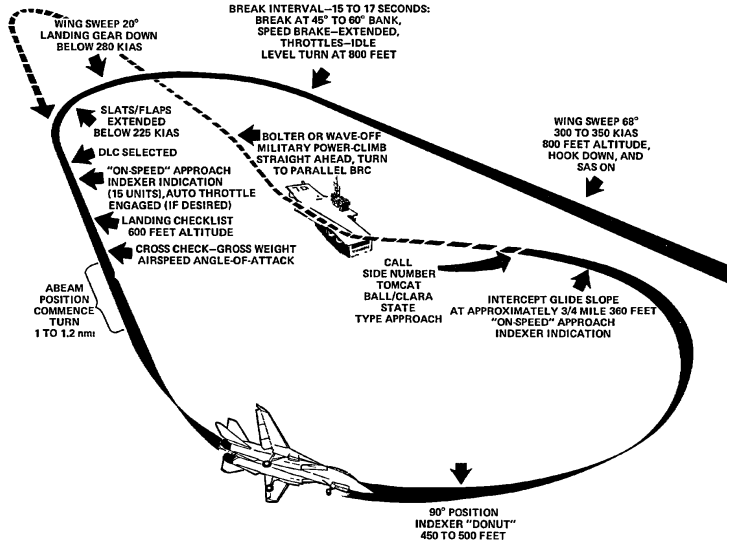
1.8 TAKEOFF - SHORE

		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

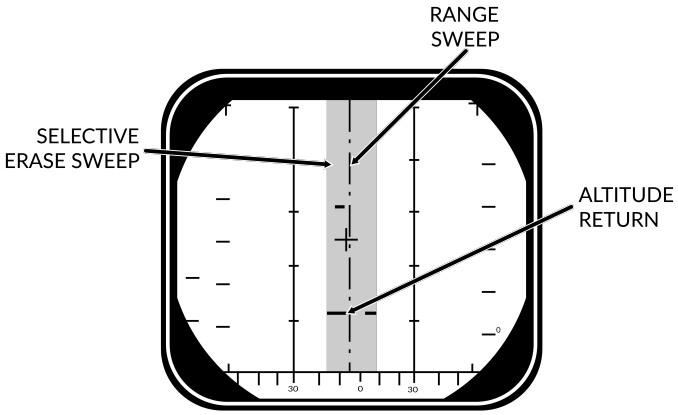
3.1 MAIN MODES - OVERVIEW

	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**

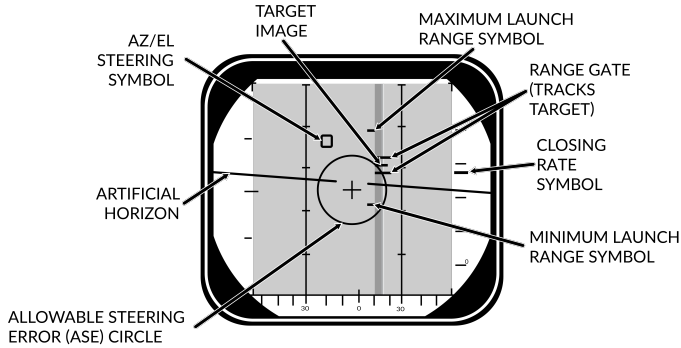
3.3 PULSE MODE - PULSE SEARCH



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**

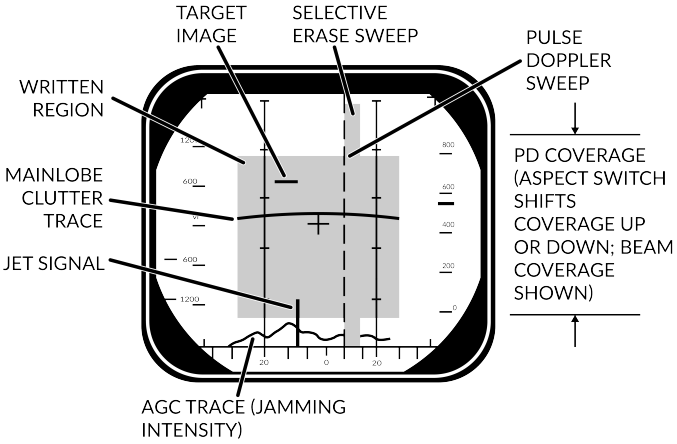
3.4 PULSE MODE - PSTT



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

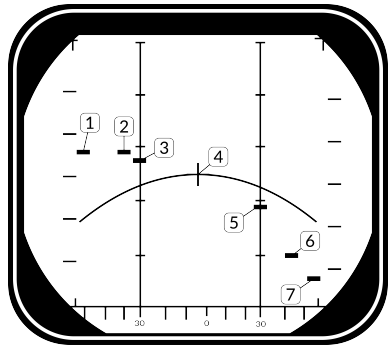
3.5 PULSE DOPPLER MODE - PULSE DOPPLER SEARCH



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

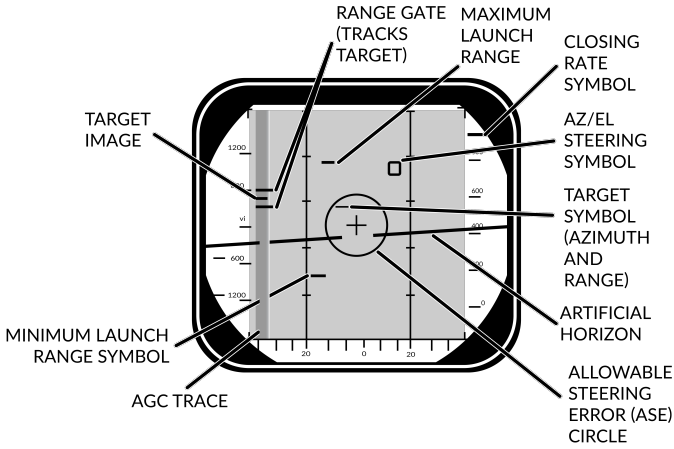
3.8 PULSE DOPPLER MODE - TWS MAN

• **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



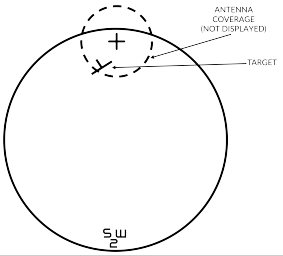
SINGLE TARGET TRACK

• **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

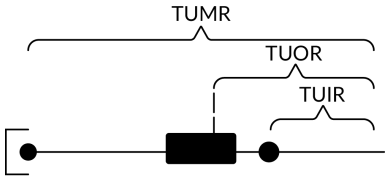
3.13 TID SYMBOLOGY

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

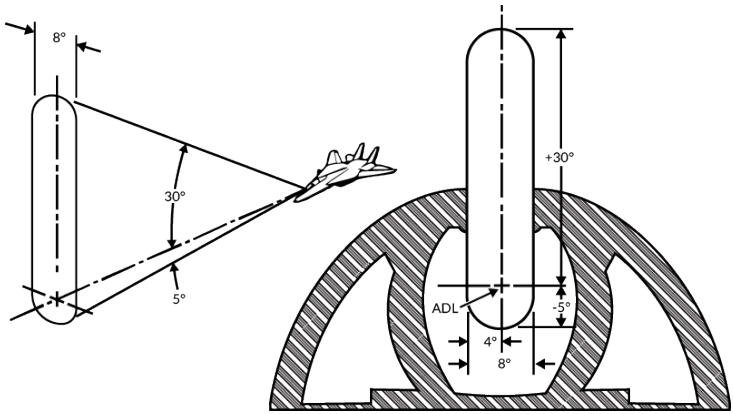
1.	**Pilot Conditions**	• **MASTER ARM** ..... **ON** • **HUD** ..... **A/A** • **SW COOL** ..... **ON** • **MODE/STP** ..... **As Desired** • **WEAPON SELECTOR** ..... **SW**
2.	**Employment**	(a) **CAGE/SEAM** ..... **Uncage Seeker** (b) **IR-Lock** ..... **Good Tone** (c) **Trigger** ..... **FIRE**

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)