

# Pocket Checklist

## F-14A/B AIRCRAFT

REV: 20220222



Procedures

Systems

AWG-9  
Radar

TCS  
LANTIRN

A/G  
Weapons

A/A  
Weapons



## **DISCLAIMER**

**This document represents a personal project and is intended for entertainment purposes only. Do not use for training purposes or in real life scenarios.**

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# Chapter 1

## PROCEDURES

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## 1.1 START-UP

## 1.1.1 PILOT - PRE-START

1.	<b>Parking Brake</b>	<b>ENGAGED</b>
2.	<b>Ground Power</b>	connected
3.	<b>Compressed Air</b>	connected
4.	<b>ICS</b>	<b>HOT MIC</b>
5.	<b>TO RIO</b>	"Begin Start-Up"
6.	<b>ICS</b>	<b>Comm Check</b>
7.	<b>MASTER TEST Selector</b>	<p>(a) <b>LTS</b></p> <ul style="list-style-type: none"> <li>• <b>Warning Lights</b> ..... checked</li> <li>• <b>Caution Lights</b> ..... checked</li> <li>• <b>Advisory Lights</b> .....checked</li> </ul> <p>(b) <b>FIRE DET/EXT</b></p> <ul style="list-style-type: none"> <li>• <b>L FIRE GO</b> ..... illuminated</li> <li>• <b>R FIRE GO</b> ..... illuminated</li> </ul> <p>(c) <b>INST</b></p> <ul style="list-style-type: none"> <li>• <b>RPM</b> ..... 96%</li> <li>• <b>EGT</b> ..... 960 C</li> <li>• <b>FF</b> ..... 10500 pph</li> <li>• <b>AOA</b> ..... <math>18 \pm 5</math></li> <li>• <b>Wing Sweep</b> ..... <math>45 \pm 2.5</math></li> <li>• <b>FUEL QTY</b> ..... <math>2000 \pm 200</math></li> <li>• <b>Oxygen QTY</b> ..... 2 liters</li> <li>• <b>L&amp;R FF lights</b> ..... illuminated</li> </ul> <p>(d) <b>OFF</b></p>
8.	<b>Ejection Seat</b>	Armed
9.	<b>RIO</b>	Canopy Closed
10.	<b>Oxygen</b>	<b>ON (FWD)</b>
11	<b>Emergency Wing Sweep</b>	<b>OVERSWEEP</b>

## 1.1.2 PILOT - ENGINE START

1.	<b>AIR SOURCE</b>	<b>OFF</b>
2.	<b>Hydraulics</b>	(a) <b>HYD TRANSFER PUMP</b> ..... <b>SHUTOFF</b> (b) <b>Emerg. Hyd.</b> ..... <b>AUTO (LOW)</b>
3.	<b>L&amp;R MASTER GEN</b>	<b>NORM</b>
4.	<b>RIO</b>	"Ready to Start"
5.	<b>Right Engine Start-Up</b>	(a) <b>Engine Crank</b> ..... <b>R</b> (b) <b>R Eng N2</b> ..... 20% (c) <b>R Throttle</b> ..... <b>IDLE</b> (d) <b>TIT</b> ..... < 890 C during start (e) <b>R GEN CAUTION</b> ..... extinguished
6.	<b>Stabilized Parameters</b>	<ul style="list-style-type: none"> <li>• <b>RPM</b> ..... 62-78%</li> <li>• <b>TIT</b> ..... approx 500 C</li> <li>• <b>Fuel Flow</b> ..... 950-1400 pph</li> <li>• <b>NOZ</b> ..... 5 (100%)</li> <li>• <b>Oil Pressure</b> ..... 25-35 psi</li> <li>• <b>Hyd Pressure</b> ..... 3000 psi</li> </ul>
7.	<b>Left Engine Start-Up</b>	(a) <b>Engine Crank</b> ..... <b>L</b> (b) <b>L Eng N2</b> ..... 20% (c) <b>L Throttle</b> ..... <b>IDLE</b> (d) <b>TIT</b> ..... < 890 C during start (e) <b>L GEN Caution</b> ..... extinguished
8.	<b>Stabilized Parameters</b>	<ul style="list-style-type: none"> <li>• <b>RPM</b> ..... 62-78%</li> <li>• <b>TIT</b> ..... approx 500 C</li> <li>• <b>Fuel Flow</b> ..... 950-1400 pph</li> <li>• <b>NOZ</b> ..... 5 (100%)</li> <li>• <b>Oil Pressure</b> ..... 25-35 psi</li> <li>• <b>Hyd Pressure</b> ..... 3000 psi</li> </ul>
9.	<b>HYD TRANSFER PUMP</b>	<b>NORM</b>
10.	<b>HYD PRESSURE</b>	3000 psi
11.	<b>AIR SOURCE</b>	<b>BOTH ENG</b>
12.	<b>Ground Power</b>	disconnected
13.	<b>Compressed Air</b>	disconnected

## 1.1.3 PILOT - POST-START

1.	<b>TO RIO</b>	"Both Engines Running"
2.	<b>Displays Control Panel</b>	<ul style="list-style-type: none"> <li>• <b>VDI</b> ..... <b>ON</b></li> <li>• <b>HUD</b> ..... <b>ON</b></li> <li>• <b>HSD</b> ..... <b>ON</b></li> <li>• <b>HDS MODE</b> ..... <b>TID</b> (monitor INS)</li> </ul>
3.	<b>RIO</b>	<b>Select Align Quality</b> <ul style="list-style-type: none"> <li>• <b>INS GO NOW:</b> shortest but least precise alignment</li> <li>• <b>INS GO COARSE:</b> does not meet Launch Criteria for AIM-7 / AIM-54</li> <li>• <b>INS GO MIN WPN LAUNCH:</b> allows AIM-7 / AIM-54 launch</li> <li>• <b>INS GO FINE</b> fine align (8 min)</li> </ul>
4.	<b>ACM Panel</b>	<ul style="list-style-type: none"> <li>• <b>GUN RATE</b> ..... as required</li> <li>• <b>SW COOL</b> ..... <b>OFF</b></li> <li>• <b>MSL PREP</b> ..... <b>OFF</b></li> <li>• <b>Missile MODE/STP</b> ..... <b>NORM</b></li> </ul>
5.	<b>Gun Rounds</b>	<b>Set</b>
6.	<b>ANTI-SKID SPOILER BK</b>	<b>OFF</b>
7.	<b>Emergency Wing Sweep</b>	(a) <b>Handle</b> ..... <b>AFT</b> (b) <b>Angle</b> ..... Verify 68 deg
8.	<b>AFCS Panel - SAS STAB AUG</b>	<ul style="list-style-type: none"> <li>• <b>PITCH</b> ..... <b>ON</b></li> <li>• <b>ROLL</b> ..... <b>ON</b></li> <li>• <b>YAW</b> ..... <b>ON</b></li> </ul>
9.	<b>WING/EXT TRANS</b>	<b>AUTO</b>
10.	<b>UHF 1 Function Selector</b>	<b>BOTH</b>
11.	<b>TACAN Function Selector</b>	<b>T/R</b>
12.	<b>ARA-63 ICLS RECEIVER</b>	<b>ON</b>

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

**WARNING**

- **PARKING BRAKE MUST BE ENGAGED DURING ALIGNMENT.**  
Lack of parking brake engagement inhibits INS alignment

## 1.1.4 RIO - PRE-START

1. <b>Oxygen</b>	<b>ON (FWD)</b>
2. <b>PILOT</b>	<ul style="list-style-type: none"> <li>• <b>Ground Power</b> .....connected</li> <li>• <b>Compressed Air</b> .....connected</li> </ul>
3. <b>ICS</b>	Comm Check
4. <b>Lights</b>	As required
5. <b>LTS Test</b>	Coordinate with Pilot
6. <b>Ejection Seats</b>	<b>ARMED</b>
7. <b>Canopy</b>	<b>CLOSED</b>
8. <b>TO PILOT</b>	"Ready to Start"

## 1.1.5 RIO - POST-START - SHORE

1. <b>PILOT</b>	<ul style="list-style-type: none"> <li>• <b>Engines</b> ..... started</li> <li>• <b>AIR SOURCE</b> ..... BOTH ENG</li> </ul>
2. <b>INS STARTUP</b>	(a) <b>LIQUID COOLING</b> ..... <b>ON (FWD)</b> (b) <b>WCS Switch</b> ..... <b>STANDBY</b> (c) <b>IR/TV Power</b> ..... <b>STBY/IR/TV</b> (d) <b>TID/DDD</b> ..... illuminated after 40 s
3. <b>Kneeboard</b>	Retrieve Coordinates, Elevation, Magnetic Variation from GROUND SETTINGS Page

**WARNING** Input Coords **BEFORE** selecting **GND ALIGN** if using ASH

4. <b>Start INS Align</b>	(a) <b>Nav Mode</b> ..... <b>GND ALIGN</b> (b) <b>CAP</b> <ul style="list-style-type: none"> <li>• <b>Category</b> ..... <b>NAV</b></li> <li>• <b>MESSAGE</b> ..... <b>OWN AC</b></li> </ul> (c) <b>Keyboard</b> <ul style="list-style-type: none"> <li>• <b>CLEAR, LAT</b>, latitude, <b>ENTER</b></li> <li>• <b>LONG</b>, longitude, <b>ENTER</b></li> <li>• <b>ALT</b>, altitude, <b>ENTER</b></li> </ul> (d) <b>CAP MESSAGE</b> ..... <b>MAG HDG VAR</b> (e) <b>Keyboard</b> ..... <b>HDG</b> , mag var, <b>ENTER</b> (f) <b>Align Progress</b> ..... Monitor
5. <b>U/VHF Mode</b>	<b>T/R G</b>

6. <b>Datalink</b>	(a) <b>Kneeboard</b> ..... TACTICAL DL (b) <b>DL Power</b> ..... <b>ON (FWD)</b> (c) <b>DL Mode</b> ..... <b>TAC (AFT)</b> (d) <b>DL Freq.</b> ..... <b>Set</b>
7. <b>TACAN</b>	<b>T/R</b>
8. <b>RWR Panel</b>	(a) <b>Display Type</b> ..... <b>NORM</b> (b) <b>PWR</b> ..... <b>ON</b> (c) <b>TEST</b> ..... <b>SPL</b> (d) <b>MODE</b> ..... <b>LMT</b>
9. <b>DECM</b>	<b>STBY</b> , then <b>ACT</b>
10. <b>IFF</b>	(a) <b>MASTER</b> ..... <b>STBY</b> (b) <b>CODE</b> ..... as required
11. <b>Altimeter</b>	Reset
12. <b>CAP</b>	Enter Data (WP, FP, etc.)
13. <b>Displays</b>	<ul style="list-style-type: none"> <li>• <b>DDD</b> ..... Set</li> <li>• <b>TID</b> ..... Set</li> <li>• <b>Multiple Display Indicator</b> ..... Set</li> </ul>
14. <b>Hand Control Panel</b>	Set
15. <b>AN/ALE-39</b>	Set (as required) <ul style="list-style-type: none"> <li>• <b>AUTO (CHAFF)/MAN</b></li> <li>• <b>MAN</b></li> </ul>
16. <b>Flare Mode</b>	<b>PILOT</b>
17. <b>Complete INS Align</b>	<ul style="list-style-type: none"> <li>• <b>Duration Full Fine</b> ..... 8 min</li> <li>• <b>Duration ASH</b> ..... much faster</li> </ul> (a) <b>Align Complete</b> ..... Caret → Diamond (b) <b>NAV Mode</b> ..... <b>INS NAV</b>
18. <b>Standby ADI</b>	Erect at least 2 min before T/O
19. <b>TO PILOT</b>	"Ready to Taxi"
<b>Once Airborne</b>	
20. <b>IR/TV Power</b>	<b>ON</b>
21. <b>WCS Switch</b>	<b>WCS XMT</b>

## 1.1.6 RIO - POST-START - CARRIER

1. <b>PILOT</b>	<ul style="list-style-type: none"> <li>Engines ..... started</li> <li>AIR SOURCE ..... BOTH ENG</li> </ul>
2. <b>INS STARTUP</b>	(a) LIQUID COOLING ..... ON (FWD) (b) WCS Switch ..... STANDBY (c) IR/TV Power ..... STBY/IR/TV (d) TID/DDD ..... illuminated after 40 s
3. <b>Datalink</b>	(a) Kneeboard ..... TACTICAL DL (b) DL Power ..... ON (FWD)
4. <b>Start INS Align</b>	(a) DL FREQ ..... Set (b) DL Mode ..... CAINS/WAYPT (c) Nav Mode ..... CVA
5. <b>U/VHF Mode</b>	T/R G
6. <b>TACAN</b>	T/R
7. <b>RWR Panel</b>	(a) Display Type ..... NORM (b) PWR ..... ON (c) TEST ..... SPL (d) MODE ..... LMT
8. <b>DECM</b>	STBY, then ACT
9. <b>IFF</b>	(a) MASTER ..... STBY (b) CODE ..... as required
10. <b>Altimeter</b>	Reset
11. <b>CAP</b>	Enter Data (WP, FP, etc.)
12. <b>Displays</b>	<ul style="list-style-type: none"> <li>DDD ..... Set</li> <li>TID ..... Set</li> <li>Multiple Display Indicator ..... Set</li> </ul>
13. <b>Hand Control Panel</b>	Set
14. <b>AN/ALE-39</b>	Set (as required) <ul style="list-style-type: none"> <li>AUTO (CHAFF)/MAN</li> <li>MAN</li> </ul>
15. <b>Flare Mode</b>	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****WARNING**

- Input Coords **BEFORE** selecting **GND ALIGN** if using ASH. Else alignment can progress too far to correct coordinates by the time they are input.
- **PARKING BRAKE MUST BE ENGAGED DURING ALIGNMENT.**  
Lack of parking brake engagement inhibits INS alignment



## 1.2 TAKEOFF & LANDING

### 1.2.1 PRE-TAXI

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

### 1.2.2 TAKEOFF - SHORE

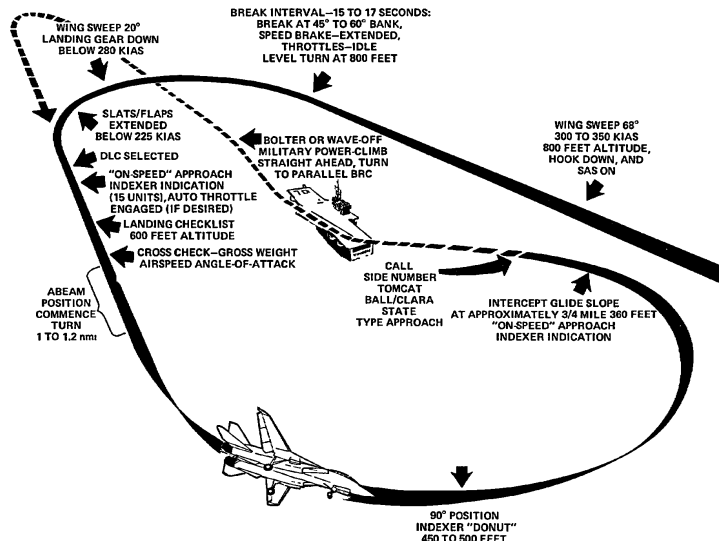
#### After Lining Up On Runway

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

## 1.2.3 TAKEOFF - CARRIER

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

## 1.2.4 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. <b>Final Turn</b>	180 Deg Position • Abeam Pos. .... 1-1.2 nmi 90 Deg Position • AOA ..... DONUT • Altitude ..... 400-500 ft
6. <b>Intercept Glideslope</b>	• Distance ..... 3/4 Mile • Altitude ..... 360 ft • AOA ..... ON-SPEED

### 1.2.5 LANDING - CHECKLIST

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

## **1.3 IN-FLIGHT**

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### **1.3.1 AERIAL REFUELING**

## 1.3.2 AIRSTART

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

# Chapter 2

## SYSTEMS

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## 2.1 FLIGHT CONTROL

### 2.1.1 AFCS - SAS

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li><b>SAS</b></li> </ul>                                  | <ul style="list-style-type: none"> <li><b>Stability Augmentation System</b> <ul style="list-style-type: none"> <li><b>Not Fly-by-Wire</b></li> <li>Automatic control surface commands generated by analog computer to improve stability</li> </ul> </li> </ul> |
| <ul style="list-style-type: none"> <li><b>Controls</b></li> </ul>                             | <ul style="list-style-type: none"> <li><b>Three individual Switches</b> <ul style="list-style-type: none"> <li>Pitch</li> <li>Roll</li> <li>Yaw</li> </ul> </li> </ul>   |
| <ul style="list-style-type: none"> <li><b>Autopilot Emergency Disengage Paddle</b></li> </ul> | <ul style="list-style-type: none"> <li><b>Paddle on Stick</b> <ul style="list-style-type: none"> <li>Disengages Autopilot Modes</li> <li>Deactivates Pitch, Roll SAS Channels</li> </ul> </li> </ul>   |

### 2.1.2 AFCS - AUTOPILOT

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li><b>Attitude Hold</b></li> </ul> | <ul style="list-style-type: none"> <li><b>Basic Attitude Hold</b> <ul style="list-style-type: none"> <li>Maintains existing pitch &amp; roll</li> <li>Attitude can be changed with stick input</li> <li>If engaged outside limits will automatically move within range</li> </ul> </li> <li><b>Limits</b> <ul style="list-style-type: none"> <li>Pitch: 30 deg</li> <li>Roll: 60 deg</li> </ul> </li> <li><b>Engagement</b> <ul style="list-style-type: none"> <li>(a) <b>SAS Switches</b> ..... <b>ON (FWD)</b></li> <li>(b) <b>Alt. Hold Mode</b> ..... <b>OFF</b></li> <li>(c) <b>VEC/PCD/ACL</b> ..... <b>OFF</b></li> <li>(d) <b>Heading Mode</b> ..... <b>OFF</b></li> <li>(e) <b>Autopilot Switch</b> ..... <b>ENGAGE (FWD)</b></li> </ul> </li> </ul> |
|--|---|

<ul style="list-style-type: none"> <li>• <b>Altitude Hold</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Barometric Altitude Hold</b> <ul style="list-style-type: none"> <li>– Maintains current barometric altitude</li> </ul> </li> <li>• <b>Limits</b> <ul style="list-style-type: none"> <li>– Vertical velocity: &lt; 100 ft/s</li> </ul> </li> <li>• <b>Engagement</b> <ul style="list-style-type: none"> <li>(a) <b>SAS Switches</b> ..... <b>ON (FWD)</b></li> <li>(b) <b>Autopilot Switch</b> ..... <b>ENGAGE (FWD)</b></li> <li>(c) <b>Alt. Hold Mode</b> ..... <b>ALT (FWD)</b></li> <li>(d) <b>A/P REF Light</b> ..... Wait until appears</li> <li>(e) <b>NWS Button</b> ..... <b>Press</b></li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>Heading Hold</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Magnetic Heading Hold</b> <ul style="list-style-type: none"> <li>– Maintains current magnetic heading</li> </ul> </li> <li>• <b>Limits</b> <ul style="list-style-type: none"> <li>– Bank angle &lt; 5 deg</li> </ul> </li> <li>• <b>Engagement</b> <ul style="list-style-type: none"> <li>(a) <b>SAS Switches</b> ..... <b>ON (FWD)</b></li> <li>(b) <b>Autopilot Switch</b> ..... <b>ENGAGE (FWD)</b></li> <li>(c) <b>Heading Mode</b> ..... <b>HDG (FWD)</b></li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>Ground Track</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Autopilot follows ground track</b> <ul style="list-style-type: none"> <li>– Similar to heading hold</li> <li>– Compensates for wind drift</li> <li>– Uses INS data instead of mag. bearing</li> </ul> </li> <li>• <b>Limits</b> <ul style="list-style-type: none"> <li>– Bank angle &lt; 5 deg</li> </ul> </li> <li>• <b>Engagement</b> <ul style="list-style-type: none"> <li>(a) <b>SAS Switches</b> ..... <b>ON (FWD)</b></li> <li>(b) <b>Autopilot Switch</b> ..... <b>ENGAGE (FWD)</b></li> <li>(c) <b>Heading Mode</b> ..... <b>GT (AFT)</b></li> <li>(d) <b>A/P REF Light</b> ..... Wait until appears</li> <li>(e) <b>NWS Button</b> ..... <b>Press</b></li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>VEC/PCD</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Vector / Precision Course Direction</b> <ul style="list-style-type: none"> <li>– Allows Link 4 controller to remotely direct the aircraft</li> <li>– <b>Not Modelled in DCS</b></li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>ACL</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Automatic Carrier Landing</b> <ul style="list-style-type: none"> <li>– See relevant section</li> </ul> </li> </ul>

- **Autopilot Emergency Disengage Paddle**

- **Paddle on Stick**
  - Disengages Autopilot Modes
  - Deactivates Pitch, Roll SAS Channels

### 2.1.3 APC / AUTOTHROTTLE

• <b>APC</b>	<ul style="list-style-type: none"> <li>• <b>Approach Power Compensator</b> <ul style="list-style-type: none"> <li>– Automatic throttle control</li> <li>– <b>Maintains ON SPEED AoA</b></li> </ul> </li> </ul>
• <b>Conditions</b>	<p>Engagement is inhibited / APC is disengaged if conditions not met</p> <ul style="list-style-type: none"> <li>• <b>Throttles</b> ..... 75%-90% RPM</li> <li>• <b>Landing Gear Handle</b> ..... <b>Down</b></li> <li>• <b>Weight on Wheels</b> ..... <b>No</b></li> </ul>
• <b>Engage</b>	<ul style="list-style-type: none"> <li>• <b>Throttle Mode</b> ..... <b>AUTO (FWD)</b></li> </ul>
• <b>Disengage</b>	<b>Cage/Seam Button</b>

### 2.1.4 ACLS

### 2.1.5 WING-SWEEP

• <b>Overview</b>	<ul style="list-style-type: none"> <li>• <b>In Flight Limited between 20 deg &amp; 68 deg</b></li> <li>• <b>On Ground can Oversweep to 75 deg</b></li> <li>• <b>Hydromechanically Controlled</b> <ul style="list-style-type: none"> <li>– Automatically through CADC</li> <li>– Manually with emergency wing-sweep handle</li> </ul> </li> <li>• <b>15 deg/s at 1g loading</b></li> <li>• <b>Mechanically linked to ensure symmetry</b></li> </ul>
• <b>CADC Modes</b>	<ul style="list-style-type: none"> <li>• <b>AUTO</b> <ul style="list-style-type: none"> <li>– CADC controls wing position as function of current Mach via wing-sweep program</li> </ul> </li> <li>• <b>MAN</b> <ul style="list-style-type: none"> <li>– Pilot manually chooses desired wing sweep angle with thumb controller</li> </ul> </li> <li>• <b>BOMB</b> <ul style="list-style-type: none"> <li>– Sets wing sweep to <b>55 deg</b> or further aft</li> </ul> </li> </ul>

• <b>Emergency Mode</b>	<ul style="list-style-type: none"> <li>• <b>Emergency Wing-Sweep Handle</b> <ul style="list-style-type: none"> <li>– Moved with wing sweep program by spider detent under normal operation</li> <li>– Can be forced out of spider detent and moved manually</li> </ul> </li> </ul>
• <b>Oversweep</b>	<ul style="list-style-type: none"> <li>• <b>Selected via Emergency Wing-Sweep Handle</b> <ul style="list-style-type: none"> <li>(a) <b>Em. Wing-Sweep</b> ..... <b>68 deg</b> Wait for wing-seal airbags to deflate</li> <li>(b) <b>HZ TAIL AUTH</b> ..... <b>Illuminated</b></li> <li>(c) <b>Em. Wing-Sweep</b> ..... <b>75 deg</b></li> </ul> </li> </ul>
• <b>Return to CADC Control</b>	<ul style="list-style-type: none"> <li>• <b>After Emergency Mode / Oversweep</b> <ul style="list-style-type: none"> <li>(a) <b>Em. Wing-Sweep</b> ..... <b>Spider Detent</b> (Fwd on startup)</li> <li>(b) <b>MASTER RESET</b> ..... <b>Press</b></li> </ul> </li> </ul>

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

## 2.2 NAVIGATION

### 2.2.1 NAV - OVERVIEW

Pilot Cockpit Interface	
• <b>HUD</b>	<b>Heads Up Display</b> <ul style="list-style-type: none"> <li>Displays WRITE ME information</li> </ul>
• <b>VDI</b>	<b>Vertical Display Indicator</b> <ul style="list-style-type: none"> <li>placeholder</li> </ul>
• <b>HSD</b>	<b>Horizontal Situation Display</b> <ul style="list-style-type: none"> <li><b>NAV Mode</b> Information               <ul style="list-style-type: none"> <li><b>Diamond</b> – Current heading</li> <li><b>Chevron</b> – <b>TACAN TO</b> bearing</li> <li><b>+ – TACAN FROM</b> bearing</li> <li><b>House</b> – <b>ADF</b> bearing</li> <li><b>RNG</b> – Range to Waypoint (nm)</li> <li><b>MODE</b> – <b>NAV STEER</b> mode</li> <li><b>W</b> – Wind heading / speed (kts)</li> <li><b>TAS</b> – True AirSpeed (kts)</li> <li><b>GS</b> – GroundSpeed (kts)</li> </ul> </li> <li><b>TID Mode</b> Information               <ul style="list-style-type: none"> <li>Overhead View</li> <li>Waypoint Coordinates</li> </ul> </li> </ul>
• <b>BDHI</b>	<ul style="list-style-type: none"> <li>placeholder</li> </ul>
• <b>Standby Magnetic Compass</b>	<ul style="list-style-type: none"> <li>placeholder</li> </ul>
• <b>Tacan Control Panel</b>	<ul style="list-style-type: none"> <li>placeholder</li> </ul>
• <b>STEER CMD Selectors</b>	<ul style="list-style-type: none"> <li>placeholder</li> </ul>

### 2.2.2 NAV - INS

<ul style="list-style-type: none"> <li>• <b>Contributing Sub-systems</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>IMU</b> – Inertial Measurement Unit               <ul style="list-style-type: none"> <li>– <b>4 Gimbals</b> – No gimbal-lock, corrects platform attitude errors</li> <li>– <b>2 Gyros</b> – Source for aircraft attitude data</li> <li>– <b>3 Accelerometers</b> – Source for aircraft acceleration data</li> </ul> </li> <li>• <b>CSDC</b> – Computer Signal Data Converter               <ul style="list-style-type: none"> <li>– Processes sensor signals including IMU data</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>CSDC Data Modes</b></li> </ul>	<ul style="list-style-type: none"> <li>(a) <b>INS</b> – Primary nav mode               <ul style="list-style-type: none"> <li>• <b>Velocity Data</b> – IMU</li> <li>• <b>Pitch/Roll Data</b> – IMU</li> </ul> </li> <li>(b) <b>IMU/AM</b> – Backup mode selected by RIO or automatically when CSDC determines IMU velocity data unreliable.               <ul style="list-style-type: none"> <li>• <b>Velocity Data</b> – Calculated from true airspeed &amp; stored wind</li> <li>• <b>Pitch/Roll Data</b> – IMU</li> </ul> </li> <li>(c) <b>AHRS/AM</b> – Further degraded mode selected by RIO or automatically when CSDC detects total INS failure               <ul style="list-style-type: none"> <li>• <b>Heading</b> – Mag heading &amp; MAG VAR</li> <li>• <b>Velocity Data</b> – Calculated from true airspeed &amp; stored wind</li> <li>• <b>Pitch/Roll Data</b> – AHRS</li> </ul> </li> </ul>

### 2.2.3 NAV - ALIGNMENT

• <b>Ground Align</b>	(a)
• <b>Carrier Align D/L</b>	
• <b>Carrier Align Handset</b>	
• <b>Reinitialization</b>	
• <b>Automatic Stored Heading</b>	
• <b>Catapult Align</b>	

## 2.2.4 NAV - 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

## 2.2.5 NAV - TACAN

## 2.2.6 NAV - VOR/ADF





## 2.3 COMMUNICATION

### 2.3.1 COMMS - OVERVIEW

• <b>ARC-159 UHF 1</b>	<ul style="list-style-type: none"> <li>• Air-to-Air &amp; Air-to-Surface Communication</li> <li>• Pilot Controlled</li> <li>• Frequency               <ul style="list-style-type: none"> <li>– Range – 225.000 - 399.975 MHz</li> <li>– Steps – 25 kHz</li> <li>– Channels – 20</li> </ul> </li> </ul>
• <b>ARC-182 V/UHF 2</b>	<ul style="list-style-type: none"> <li>• Air-to-Air &amp; Air-to-Surface Communication</li> <li>• RIO Controlled</li> <li>• Frequency               <ul style="list-style-type: none"> <li>– Band 1 – 30 - 88 MHz</li> <li>– Band 2 – 108 - 156 MHz</li> <li>– Band 3 – 156 - 174 MHz</li> <li>– Band 4 – 225 - 399.975 MHz</li> <li>– Steps – 25 kHz</li> <li>– Channels – 20</li> </ul> </li> </ul>
• <b>ARA-50 UHF ADF</b>	<ul style="list-style-type: none"> <li>• UHF Automatic Direction Finder</li> <li>• LoS bearing to UHF Transmitter</li> <li>• Bearing displayed on BDHI, Pilot HSD</li> <li>• 5 min Warmup</li> </ul>
• <b>KY-28 Voice Security Equipment</b>	<ul style="list-style-type: none"> <li>• Voice Cipherring</li> <li>• Integrated with UHF 1 and V/UHF 2</li> <li>• 2 min Warmup</li> </ul>

### 2.3.2 COMMS - ARC-159 UHF 1

• <b>ARC-159 UHF 1</b>	<ul style="list-style-type: none"> <li>• Air-to-Air &amp; Air-to-Surface Communication</li> <li>• Pilot Controlled</li> <li>• Frequency               <ul style="list-style-type: none"> <li>– Range – 225.000 - 399.975 MHz</li> <li>– Steps – 25 kHz</li> <li>– Channels – 20</li> </ul> </li> </ul>
• <b>VOL Knob</b>	• Controls Pilot UHF 1 Audio Level
• <b>BRT/TEST Knob</b>	<ul style="list-style-type: none"> <li>• Controls Radio FREQ Display</li> <li>• Turn past max to display 888.888</li> </ul>
• <b>SQL Switch</b>	• Toggles radio squelch (noise attenuation)

• <b>READ Switch</b>	• Displays Frequency of Selected Preset Channel
• <b>LOAD Button</b>	• Saves Displayed Frequency to Selected Preset Channel
• <b>TONE Button</b>	• Steady 1.020 kHz Test Tone
• <b>Mode Selector</b>	• Frequency Selection Method <ul style="list-style-type: none"> <li>– <b>GUARD</b> – 243.000 MHz</li> <li>– <b>MANUAL</b> – Manual tuning</li> <li>– <b>PRESET</b> – Preset channels</li> </ul>
• <b>Function Selector</b>	• Selects Transceivers to Energize <ul style="list-style-type: none"> <li>– <b>ADF</b> – Not simulated</li> <li>– <b>BOTH</b> – Main &amp; Guard</li> <li>– <b>MAIN</b> – Main</li> <li>– <b>OFF</b> – Secures UHF 1 radio</li> </ul>
• <b>CHAN SEL</b>	• Selects from 20 preset Channels

### 2.3.3 COMMS - ARC-182 V/UHF 2

• <b>ARC-182 V/UHF 2</b>	<ul style="list-style-type: none"> <li>• Air-to-Air &amp; Air-to-Surface Communication</li> <li>• RIO Controlled</li> <li>• Frequency <ul style="list-style-type: none"> <li>– <b>Band 1</b> – 30 - 88 MHz</li> <li>– <b>Band 2</b> – 108 - 156 MHz</li> <li>– <b>Band 3</b> – 156 - 174 MHz</li> <li>– <b>Band 4</b> – 225 - 399.975 MHz</li> <li>– <b>Steps</b> – 25 kHz</li> <li>– <b>Channels</b> – 20</li> </ul> </li> </ul>
• <b>VOL Knob</b>	• Controls RIO UHF 2 Audio Level
• <b>BRT/TEST Knob</b>	• Controls Radio FREQ Display
• <b>SQL Switch</b>	• 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 frequency 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**

### 2.3.4 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.

- 
- |  |  |
|--|--|
| <ul style="list-style-type: none"><li>• <b>Radio-Select Switch</b></li></ul> | <ul style="list-style-type: none"><li>• <b>Selects Radio Mode</b><ul style="list-style-type: none"><li>– <b>RELAY</b> – Acts as relay for other stations (not simulated)</li><li>– <b>RAD-2</b> – Secure voice for V/UHF 2</li><li>– <b>RAD-1</b> – Secure voice for UHF 1</li></ul></li></ul> |
|--|--|
-

## 2.3.5 LINK 4 DATALINK - OVERVIEW

• <b>Link 4</b>	<ul style="list-style-type: none"> <li>• <b>Modes</b> – Mutually exclusive <ul style="list-style-type: none"> <li>– <b>Link 4A</b> – AWACS / Surface Ship</li> <li>– <b>Link 4C</b> – Fighter to Fighter</li> </ul> </li> <li>• <b>Data Speed</b> – up to 5000 bit/s!</li> </ul>
• <b>Link 4A</b>	<ul style="list-style-type: none"> <li>• <b>Network</b> – AWACS / Surface Ship</li> <li>• Additionally used for ACLS</li> </ul>
• <b>Link 4C</b>	<ul style="list-style-type: none"> <li>• <b>Network</b> – Fighter to Fighter <ul style="list-style-type: none"> <li>– Up to four F-14s</li> <li>– Unique to F-14</li> </ul> </li> </ul>
• <b>Basic Operation</b>	<p>(a) <b>Power Switch</b> ..... As Desired</p> <ul style="list-style-type: none"> <li>• <b>Link 4A</b> ..... <b>ON</b></li> <li>• <b>Link 4C</b> ..... <b>AUX</b></li> </ul> <p>(b) <b>Mode Switch</b> ..... <b>TAC</b></p> <p>(c) <b>Frequency</b> ..... <b>Set</b></p>

## 2.3.6 LINK 4 DATALINK - CONTROL PANEL

• <b>Test Switch</b>	<ul style="list-style-type: none"> <li>• <b>Controls Test / Anti-Jam Modes</b> <ul style="list-style-type: none"> <li>– <b>TEST</b> – Initiates BIT</li> <li>– <b>NORM</b> – Normal Operation</li> <li>– <b>A-J</b> – Anti-Jam (not simulated)</li> </ul> </li> </ul>
• <b>Frequency Thumbwheels</b>	<ul style="list-style-type: none"> <li>• <b>Selects Datalink Frequency</b> <ul style="list-style-type: none"> <li>– <b>First Digit – Fixed as 3</b></li> <li>– <b>Allowable Range</b> – 300.0 - 324.9 MHz</li> </ul> </li> </ul>
• <b>Power Switch</b>	<ul style="list-style-type: none"> <li>• <b>Controls System Power</b> <ul style="list-style-type: none"> <li>– <b>ON</b> – Enables Link 4A</li> <li>– <b>OFF</b> – Disables system</li> <li>– <b>AUX</b> – Enables Link 4C</li> </ul> </li> </ul>

**2.3.7 LINK 4 DATALINK - REPLY/ANTENNA PANEL**

<ul style="list-style-type: none"><li>• <b>ANTENNA Switch</b></li></ul>	<ul style="list-style-type: none"><li>• <b>Selects Antenna</b><ul style="list-style-type: none"><li>– Shared with UHF 1 – Mutually exclusive</li><li>– UHF 1 LWR / DL UPR</li><li>– UHF 1 UPR / DL LWR</li></ul></li></ul>
<ul style="list-style-type: none"><li>• <b>REPLY Switch</b></li></ul>	<ul style="list-style-type: none"><li>• <b>Sets Reply Mode</b><ul style="list-style-type: none"><li>– <b>NORM</b> – Own Aircraft replies to datalink messages</li><li>– <b>CANC</b> – Receive only</li></ul></li></ul>
<ul style="list-style-type: none"><li>• <b>MODE Switch</b></li></ul>	<ul style="list-style-type: none"><li>• <b>Controls Overall Mode</b><ul style="list-style-type: none"><li>– <b>TAC</b> – Normal airborne mode</li><li>– <b>CAINS/WAYPT</b> – Enables CV align</li></ul></li></ul>
<ul style="list-style-type: none"><li>• <b>Address Thumbwheels</b></li></ul>	<ul style="list-style-type: none"><li>• <b>Sets Two Least Significant Bits of Aircraft D/L Address</b></li></ul>

## 2.4 DEFENSIVE SYSTEMS

### 2.4.1 ALR-67 RWR - CONTROLS / OVERVIEW

• <b>PWR Switch</b>	• <b>Set to ON to Operate</b>
• <b>VOL Knob</b>	• <b>Sets RIO Audio Level</b>
• <b>TEST Switch</b>	<ul style="list-style-type: none"> <li>• <b>Springloaded to Center</b></li> <li>• <b>BIT</b> – Initiates Build In Test</li> <li>• <b>SPL</b> – Holds BIT status page while held</li> </ul>
• <b>MODE Switch</b>	<ul style="list-style-type: none"> <li>• <b>Springloaded to Center</b></li> <li>• <b>OFST</b> – Separates overlapping symbols</li> <li>• <b>LMT</b> – Displays 6 highest threats</li> </ul>
• <b>DISPLAY TYPE Selector</b>	<ul style="list-style-type: none"> <li>• <b>Changes Priority of Display</b> <ul style="list-style-type: none"> <li>– <b>NORM</b> – Normal threat symbology</li> <li>– <b>AI</b> – Airborne Interceptor prioritized</li> <li>– <b>AAA</b> – Anti-aircraft artillery prioritized</li> <li>– <b>UNK</b> – Unknown prioritized</li> <li>– <b>FRIEND</b> – Friendly threats prioritized</li> </ul> </li> <li>• <b>Indicated by Letter in Display Center</b></li> </ul>
• <b>Display</b>	<ul style="list-style-type: none"> <li>• <b>Outer Band</b> <ul style="list-style-type: none"> <li>– <b>Critical Band</b></li> <li>– Imminent threat to own aircraft</li> <li>– Blinking indicates engaging own aircraft</li> </ul> </li> <li>• <b>Middle Band</b> <ul style="list-style-type: none"> <li>– <b>Lethal Band</b></li> <li>– Potentially threatening emitters</li> <li>– Not actively engaging own aircraft</li> </ul> </li> <li>• <b>Inner Band</b> <ul style="list-style-type: none"> <li>– <b>Non-Lethal Band</b></li> <li>– Not currently within capability of emitter</li> </ul> </li> <li>• <b>Inner Circle</b> <ul style="list-style-type: none"> <li>– <b>N, I, A, U, F</b> – Prioritization type</li> <li>– <b>O</b> – Offset</li> <li>– <b>L</b> – Limit</li> <li>– <b>B</b> – BIT Failure</li> <li>– <b>T</b> – Thermal overload</li> </ul> </li> </ul>

- **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
-



## 2.4.2 ALR-67 RWR - THREAT SYMBOLOGY

**SHIPS**

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

**AIRCRAFT**

<b>14</b>	F-14A/B
<b>15</b>	F-15C/E
<b>16</b>	F-16C
<b>17</b>	JF-17
<b>18</b>	F/A-18C
<b>19</b>	MiG-19

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

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

**AIR DEFENSE**

<b>2</b>	S-75 TR SNR (SA-2) “Fan Song”
<b>3</b>	S-125 TR SNR-125 (SA-3) “Low Blow”
<b>6</b>	Kub SA-6
<b>7</b>	HQ-7 TR
<b>8</b>	OSA (SA-8)
<b>10</b>	S-300PS 30N6 TR (SA-10)
<b>11</b>	Buk (SA-11)
<b>12</b>	S-300V
<b>15</b>	Tor 9A331 (SA-15)
<b>19</b>	Tunguska 2C6M (SA-19)
<b>A</b>	Gepard M-163 Vulcan ZSU-23-4 Shilka
<b>BB</b>	S-300PS 64H6E SR (SA-10/Big Bird)
<b>BF</b>	Rapier Blindfire TR
<b>CS</b>	S-300PS 5N66M SR (SA-10/Clam Shell)
<b>DE</b>	Sborka (Dog Ear)
<b>FF</b>	S-125 P-19 SR (SA-3/Flat Face)
<b>GR</b>	Roland SR

<b>HA</b>	Hawk SR
<b>HK</b>	Hawk TR
<b>HQ</b>	HQ-7 SR
<b>PT</b>	Patriot
<b>RO</b>	Roland
<b>RP</b>	Rapier SR
<b>S</b>	1L13 55G6 EWR
<b>SD</b>	Buk TR (SA-11/Snow Drift)
<b>SN</b>	PRW-11 (Side Net)

**MISSILES**

<b>M</b>	AIM-54 AIM-120 MICA-EM R-37 R-77 SD-10
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**ATC**

<b>T</b>	Airport ATC Radar
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## 2.4.3 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

## 2.4.4 ALQ-100 / ALQ-126 DECM



## Chapter 3

# AWG-9 RADAR

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AWG-9

### 3.1 OVERVIEW

#### 3.1.1 MAIN MODES - OVERVIEW

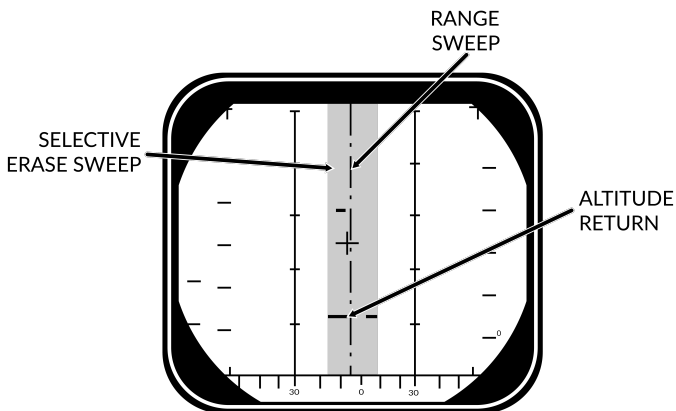
	Pulse		Pulse Doppler			
	Pulse Search	P-STT	PD Search	RWS	TWS	PD-STT
<b>Range</b>	60 nm	50 nm	110 nm	90 nm	90 nm	90 nm
<b>AIM-7</b>	BRSIT	CW	BRSIT		-	PD
<b>AIM-54</b>	BRSIT	ACT	BRSIT		Multi TGT	PD/ACT

#### 3.1.2 MAIN MODES

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• <b>Pulse</b></li> </ul>         | <ul style="list-style-type: none"> <li>• <b>Basic Pulse w/o doppler filtering</b> <ul style="list-style-type: none"> <li>- Cannot be notched</li> <li>- Ground Clutter</li> <li>- Rudimentary Ground mapping</li> </ul> </li> <li>• <b>Pulse Sub-Modes</b> <ul style="list-style-type: none"> <li>- <b>Pulse Search</b></li> <li>- <b>Pulse-STT</b></li> </ul> </li> </ul>   |
| <ul style="list-style-type: none"> <li>• <b>Pulse Doppler</b></li> </ul> | <ul style="list-style-type: none"> <li>• <b>Doppler filter → no ground returns</b> <ul style="list-style-type: none"> <li>- Susceptible to notching</li> <li>- No ground clutter</li> <li>- Greater range</li> <li>- Advanced sub modes</li> <li>- AIM-54 Guidance</li> </ul> </li> <li>• <b>Pulse Doppler Sub-Modes</b> <ul style="list-style-type: none"> <li>- <b>PD Search</b></li> <li>- <b>RWS</b></li> <li>- <b>TWS</b></li> <li>- <b>PD-STT</b></li> </ul> </li> </ul> |

## 3.2 PULSE MODES

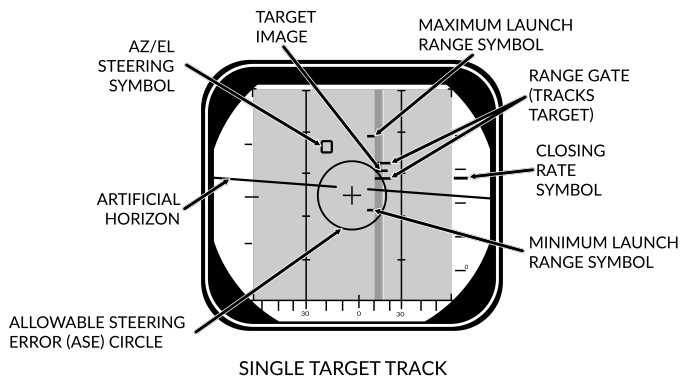
### 3.2.1 PULSE - PULSE SEARCH



SEARCH ( $\pm 10^\circ$  SCAN)

<ul style="list-style-type: none"> <li><b>Pulse Search</b></li> </ul>	<p><b>Basic Mode</b> - AWG-9 does not use pulse doppler filtering</p> <ul style="list-style-type: none"> <li><b>Advantages</b> <ul style="list-style-type: none"> <li>- All aspect target detection</li> <li>- Cannot be notched</li> <li>- Rudimentary ground mapping</li> </ul> </li> <li><b>Disadvantages</b> <ul style="list-style-type: none"> <li>- Cannot discern ground returns and targets</li> <li>- Lower range</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li><b>DDD</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Range/Azimuth</b></li> <li>Visual representation of radar and erase sweeps</li> </ul>
<ul style="list-style-type: none"> <li><b>TID</b></li> </ul>	<ul style="list-style-type: none"> <li><b>No Information from Pulse</b></li> <li><b>Cannot guide AIM-54</b></li> </ul>



**3.2.2 PULSE - PSTT**


- **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**

- Hold HCU Half-action
- Slew to desired Target
- HCU Full-Action to lock

- **Unlock Target**

- HCU Half-action

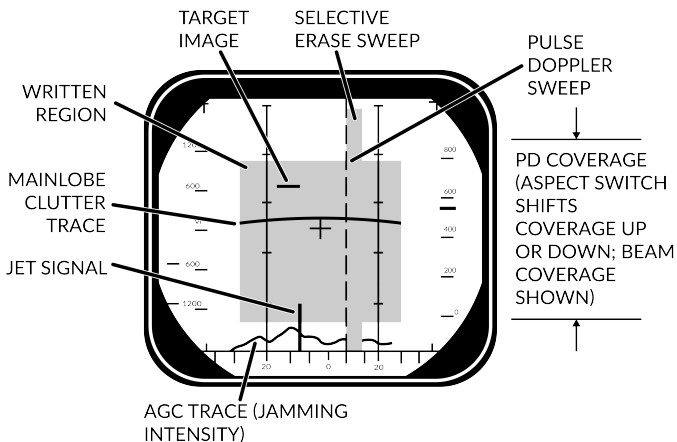
- **DDD**

- **Track Indications**

- ANT TRK light
- RDROT light
- Tracking gates
- Closure rate
- Attack Symbology

### 3.3 PULSE DOPPLER MODES

#### 3.3.1 PD - PULSE DOPPLER SEARCH



SEARCH (±40° SCAN)

<ul style="list-style-type: none"> <li><b>Pulse Doppler Search</b></li> </ul>	<p><b>“Early Warning” Mode</b> - Longest Range, cannot display range</p> <ul style="list-style-type: none"> <li><b>Advantages</b> <ul style="list-style-type: none"> <li>Longest Range</li> <li>Doppler Filtering</li> <li><b>“Look Down Shoot Down”</b></li> </ul> </li> <li><b>Disadvantages</b> <ul style="list-style-type: none"> <li>Can be notched</li> <li>No range information</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li><b>DDD</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Closure Rate/Azimuth</b></li> <li>Visual representation of radar and erase sweeps</li> </ul>
<ul style="list-style-type: none"> <li><b>Doppler Filters</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Main Lobe Clutter (MLC) Filter</b> <ul style="list-style-type: none"> <li><b>Own GS +/- 133 knots</b></li> <li>Removes main ground return</li> <li>Source of notching</li> </ul> </li> <li><b>Zero Doppler Filter</b> <ul style="list-style-type: none"> <li><b>Negative own GS +/- 100 knots</b></li> <li>Removes Radar reflection from ground directly beneath own AC</li> </ul> </li> </ul>

- **MLC Switch**

- **IN:** Enables MLC filter
- **AUTO:** Enables MLC filter if look-up angle less than 3 deg
- **OUT:** Disables MLC filter

- **Vc Switch**

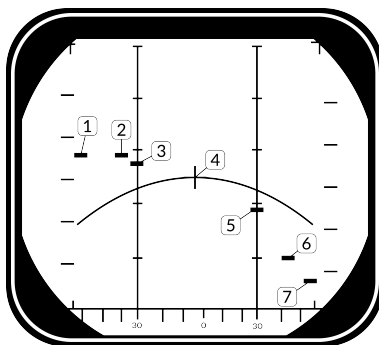
Changes closure rate DDD scale

- **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

## 3.3.2 PD - RWS

<ul style="list-style-type: none"> <li>• <b>Range While Search</b></li> </ul>	<p><b>FM Ranging</b>, used for getting good A/A picture before selecting TWS</p> <ul style="list-style-type: none"> <li>• <b>FM Ranging</b> <ul style="list-style-type: none"> <li>– Pulse Doppler with ranging</li> <li>– TID shows momentary tracks with ranges</li> <li>– Processing reduces max range</li> </ul> </li> <li>• <b>Advantages</b> <ul style="list-style-type: none"> <li>– Long Range</li> <li>– Doppler Filtering</li> <li>– <b>“Look Down Shoot Down”</b></li> <li>– Signal Processing</li> </ul> </li> <li>• <b>Disadvantages</b> <ul style="list-style-type: none"> <li>– Can be notched</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>DDD</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Closure Rate/Azimuth</b></li> <li>• Visual representation of radar and erase sweeps</li> </ul>
<ul style="list-style-type: none"> <li>• <b>TID</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Momentary Tracks</b></li> <li>• Max concurrent tracks: 48</li> <li>• <b>Cannot lock targets from TID</b></li> </ul>
<ul style="list-style-type: none"> <li>• <b>Filtering</b></li> </ul>	<p><b>Same as Pulse Doppler Search</b></p>

## 3.3.3 PD - TWS

<ul style="list-style-type: none"> <li>• <b>Track While Scan</b></li> </ul>	<p><b>Builds Track Files</b>, high situational awareness, multi-target AIM-54 launch</p> <ul style="list-style-type: none"> <li>• <b>Track Files</b> <ul style="list-style-type: none"> <li>- AWG-9 builds Trackfiles for contacts</li> <li>- Can launch multiple AIM-54</li> <li>- Processing reduces max range</li> <li>- Can lock targets from TID</li> </ul> </li> <li>• <b>FM Ranging</b> <ul style="list-style-type: none"> <li>- Pulse Doppler with ranging</li> <li>- TID shows momentary tracks with ranges</li> <li>- Processing reduces max range</li> </ul> </li> <li>• <b>Advantages</b> <ul style="list-style-type: none"> <li>- Doppler Filtering</li> <li>- <b>Multi-Target AIM-54</b></li> </ul> </li> <li>• <b>Disadvantages</b> <ul style="list-style-type: none"> <li>- <b>Lowest Range</b></li> <li>- Can be notched</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>DDD</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Closure Rate/Azimuth</b></li> <li>• Visual representation of radar and erase sweeps</li> </ul>
<ul style="list-style-type: none"> <li>• <b>TID</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Tracksfiles</b></li> <li>• Max concurrent tracks: 24</li> <li>• Max displayed tracks: 18</li> </ul>
<ul style="list-style-type: none"> <li>• <b>Filtering</b></li> </ul>	<p><b>Same as Pulse Doppler Search</b></p>
<ul style="list-style-type: none"> <li>• <b>Scan Volume</b></li> </ul>	<p>Trackfiles require update every 2.5 s -&gt;</p> <ul style="list-style-type: none"> <li>• 20 deg 4 bar (if selected)</li> <li>• 40 deg 2 bar (else)</li> </ul>
<ul style="list-style-type: none"> <li>• <b>TID Mode Selector</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>GND STAB:</b> Ground Stabilized, True North is up on TID</li> <li>• <b>A/C STAB:</b> Aircraft Stabilized</li> <li>• <b>ATTAK:</b> same as A/C STAB with superimposed attack steering symbology</li> <li>• <b>TV:</b> Displays TCS on TID, displays LANTIRN on TID if equipped</li> </ul>

<ul style="list-style-type: none"> <li>• <b>TID Display</b> <b>Selector</b> <b>Buttons</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>RID DISABLE:</b> Not simulated</li> <li>• <b>ALT NUM:</b> Enables display of track altitudes on left side of track symbols</li> <li>• <b>SYM ELEM:</b> Enables display of all supplementary symbology of tracks and waypoints</li> <li>• <b>DATA LINK:</b> Enables display of D/L contacts</li> <li>• <b>JAM STROBE:</b> Enables display of jam strobes</li> <li>• <b>NON-ATTK:</b> enables/disables display of targets not possible to engage (friendlies)</li> <li>• <b>LAUNCH ZONE:</b> Enables display of weapon launch zones</li> <li>• <b>VEL VECTOR:</b> Enables display of velocity vectors</li> </ul>
<ul style="list-style-type: none"> <li>• <b>TRACK HOLD</b> <b>CLSN Steering</b> <b>Buttons</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>TRACK HOLD</b> <ul style="list-style-type: none"> <li>– Normally: Tracks maintained for 14 s after last observation</li> <li>– Track Hold: maintained for 2 min after last observation</li> </ul> </li> <li>• <b>CLSN Button</b> <ul style="list-style-type: none"> <li>– begins collision steering to currently tracked target</li> <li>– enables Steering Centroid if in TWS</li> <li>– LD CLSN presents azimuth steering only</li> <li>– CLSN presents both azimuth and elevation steering</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>TWS AUTO / MAN</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>TWS MAN:</b> Manual azimuth/elevation control, target designation by RIO</li> <li>• <b>TWS AUTO:</b> Automatic prioritization of targets and azimuth elevation control</li> </ul>

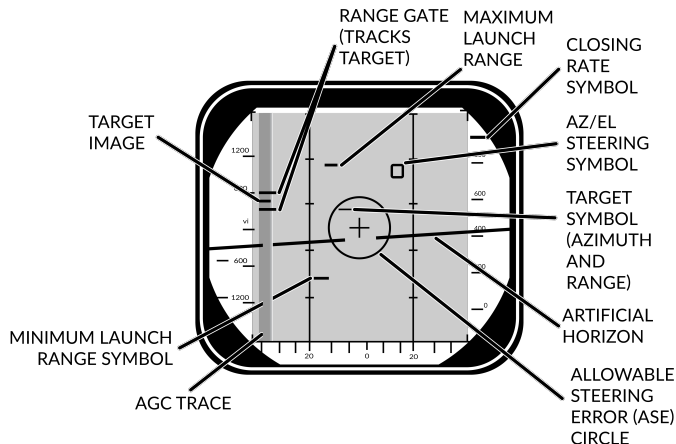
## 3.3.4 PD - TWS MAN

<ul style="list-style-type: none"><li>• <b>TWS MAN</b></li></ul>	<ul style="list-style-type: none"><li>• <b>Target Selection:</b> Manual</li><li>• <b>Scan Azimuth/Elevation:</b> Manual</li></ul>
<ul style="list-style-type: none"><li>• <b>Target Selection</b></li></ul>	<ul style="list-style-type: none"><li>• <b>Conditions</b><ul style="list-style-type: none"><li>– TWS MAN Radar Mode selected</li><li>– TID CURSOR TID Mode selected</li></ul></li><li>• <b>Hook Target</b><ul style="list-style-type: none"><li>(a) Hold HCU Half-Action</li><li>(b) Slew TID Cursor over desired Tgt</li><li>(c) HCU Full-Action to select Tgt</li></ul></li><li>• <b>TID Symbology</b><ul style="list-style-type: none"><li>– Range (<b>RA</b>)</li><li>– Bearing (<b>BR</b>)</li><li>– Altitude (<b>AL</b>)</li><li>– Magnetic course (<b>MC</b>)</li></ul></li><li>• <b>Lock Target</b><ul style="list-style-type: none"><li>(d) Press <b>PD STT</b> or <b>Pulse STT</b> buttons</li></ul></li><li>• <b>Deselect Target</b><ul style="list-style-type: none"><li>(e) press HCU Half-Action</li></ul></li></ul>
<ul style="list-style-type: none"><li>• <b>AIM-54 Launch</b></li></ul>	<ul style="list-style-type: none"><li>• <b>Automatically selects TWS AUTO</b></li><li>• <b>Prevents selection of TWS MAN</b></li></ul>

## 3.3.5 PD - TWS AUTO

<ul style="list-style-type: none"><li>• <b>TWS AUTO</b></li></ul>	<ul style="list-style-type: none"><li>• <b>Target Selection:</b> prioritizes contacts based off range, aspect, closure</li><li>• <b>Scan Azimuth/Elevation:</b> Geometric center of targets in scan volume</li></ul>
<ul style="list-style-type: none"><li>• <b>Centroid / Steering Cues</b></li></ul>	<ul style="list-style-type: none"><li>• <b>Steering Centroid</b><ul style="list-style-type: none"><li>– facilitates steering cues</li><li>– HUD, VDI, TID, DDD</li><li>– Appears as <b>X</b> on TID</li><li>– Takes Gimbal limits into account</li><li>– Weights individual Tracks based on parameters</li></ul></li><li>• <b>Illumination Centroid</b><ul style="list-style-type: none"><li>– <b>Not Visible</b></li><li>– Controls azimuth and elevation of scan pattern</li><li>– Takes scan volume into account</li></ul></li></ul>
<ul style="list-style-type: none"><li>• <b>Pilot Steering Cues</b></li></ul>	<ul style="list-style-type: none"><li>• <b>Conditions</b><ul style="list-style-type: none"><li>– A-A HUD Mode selected</li><li>– Master Arm ON (UP)</li><li>– AIM-54 or AIM-7 selected</li><li>– TWS-AUTO selected</li></ul></li></ul>



**3.3.6 PD - 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**

- Hold HCU Half-action
- Slew to desired Target
- HCU Full-Action to lock

- **Unlock Target**

- HCU Half-action

- **DDD**

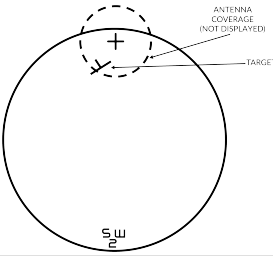
- **Track Indications**

- ANT TRK light
- RDROT light
- Tracking gates
- Closure rate
- Attack Symbology

### 3.4 ACM

#### 3.4.1 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			

<ul style="list-style-type: none"> <li>PLM</li> </ul>	<ul style="list-style-type: none"> <li>Pilot Lockon Mode</li> <li>Highest Priority ACM</li> <li>Search Pattern               <ul style="list-style-type: none"> <li>Small Boresight</li> <li>Range: 5 nm</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>VSL</li> </ul>	<ul style="list-style-type: none"> <li>Vertical Scan Lockon</li> <li>HI Search Pattern               <ul style="list-style-type: none"> <li>Width: 5 deg</li> <li>Vertical: +15 to +55 deg</li> <li>Range: 5 nm</li> </ul> </li> <li>LO Search Pattern               <ul style="list-style-type: none"> <li>Width: 5 deg</li> <li>Vertical: -15 to +25 deg</li> <li>Range: 5 nm</li> </ul> </li> <li>RIO/PILOT Controlled</li> </ul>	
<ul style="list-style-type: none"> <li>PAL</li> </ul>	<ul style="list-style-type: none"> <li>Pilot Automatic Lockon</li> <li>Search Pattern               <ul style="list-style-type: none"> <li>Width: +/- 20 deg</li> <li>Vertical: 8-bar</li> <li>Range: 15 nm</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>MRL</li> </ul>	<ul style="list-style-type: none"> <li>Manual Rapid Lockon</li> <li>RIO Controlled</li> <li>Search Pattern               <ul style="list-style-type: none"> <li>HCU Controlled</li> <li>Range: 5 nm</li> </ul> </li> </ul>	





**3.4.2 APX-76 IFF**






### 3.5 TACTICAL INFORMATION DISPLAY















#### 3.5.1 TID SYMBOLOGY

##### GENERAL





Center Dot		<ul style="list-style-type: none"> <li>• <b>Basic Component of Symbols</b> <ul style="list-style-type: none"> <li>– Marks coordinates of symbol</li> </ul> </li> </ul>
Own AC		<ul style="list-style-type: none"> <li>• <b>Symbol representing own aircraft</b> <ul style="list-style-type: none"> <li>– Ground Stabilized: Moves</li> <li>– Aircraft Stabilized: Stationary</li> <li>– Outside TID: line drawn from TID center towards symbol</li> </ul> </li> </ul>
TID Cursor		<ul style="list-style-type: none"> <li>• <b>Hook Cursor</b> <ul style="list-style-type: none"> <li>– Controlled by <b>HCU</b> in <b>TID mode</b></li> </ul> </li> <li>• <b>Half-Action</b> <ul style="list-style-type: none"> <li>– Enables display of symbol</li> <li>– Enables HCU stick to move cursor</li> </ul> </li> <li>• <b>Full-Action</b> <ul style="list-style-type: none"> <li>– Hooks closest symbol</li> <li>– If no symbol near, cursor dropped at location</li> </ul> </li> </ul>
TWS Steering Centroid		<ul style="list-style-type: none"> <li>• <b>Steering centroid of TWS tracks</b> <ul style="list-style-type: none"> <li>– Selected by WCS for weapons engagement</li> </ul> </li> </ul>

##### ONBOARD SENSORS





		Symbol Above Dot
Unknown		<ul style="list-style-type: none"> <li>• <b>Unknown Sensor Track</b></li> <li>• <b>All Returns in RWS</b></li> </ul>
Hostile		<ul style="list-style-type: none"> <li>• <b>Sensor Track designated Hostile by RIO</b></li> </ul>
Friend		<ul style="list-style-type: none"> <li>• <b>Sensor Track designated Friendly by RIO</b></li> </ul>







Angle-Track Radar Target		<ul style="list-style-type: none"> <li>• Radar Angle Tracking <ul style="list-style-type: none"> <li>– Jamming Target</li> </ul> </li> </ul>
Angle-Track Radar Target with Altitude Difference Ranging		<ul style="list-style-type: none"> <li>• Radar Angle Tracking <ul style="list-style-type: none"> <li>– Jamming Target</li> <li>– Alt. diff. ranging</li> </ul> </li> </ul>
TCS-Angle Tracked Target		<ul style="list-style-type: none"> <li>• TCS Angle Tracking</li> </ul>
TCS-Angle Tracked Target with Altitude Difference Ranging		<ul style="list-style-type: none"> <li>• TCS Angle Tracking <ul style="list-style-type: none"> <li>– Alt. diff. ranging</li> </ul> </li> </ul>
<b>D/L TARGETS</b>		<b>Symbol Below Dot</b>
Unknown		<ul style="list-style-type: none"> <li>• D/L Track designated Un- known by Source</li> </ul>
Hostile		<ul style="list-style-type: none"> <li>• D/L Track designated Hostile by Source</li> </ul>
Friendly		<ul style="list-style-type: none"> <li>• D/L Track designated Friendly by Source</li> </ul>
<b>MANUAL REF POINTS</b>		
Home base		<ul style="list-style-type: none"> <li>• Waypoint Representing <ul style="list-style-type: none"> <li>– Home Base</li> <li>– Carrier</li> <li>– Airfield</li> </ul> </li> </ul>
Waypoint		<ul style="list-style-type: none"> <li>• Nav Waypoint</li> <li>• Supplanted by Number <ul style="list-style-type: none"> <li>– 1, 2, or 3</li> </ul> </li> </ul>
Defended Point		<ul style="list-style-type: none"> <li>• Waypoint to Defend</li> </ul>
Fixed Point		<ul style="list-style-type: none"> <li>• Generic Waypoint</li> </ul>
Hostile Area		<ul style="list-style-type: none"> <li>• Waypoint Indicating Hostile Area</li> </ul>
Surface Target		<ul style="list-style-type: none"> <li>• Waypoint Indicating Surface Target</li> </ul>
IP		<ul style="list-style-type: none"> <li>• Initial Point <ul style="list-style-type: none"> <li>– Waypoint for A/G engage- ment</li> </ul> </li> </ul>

## D/L REF POINTS

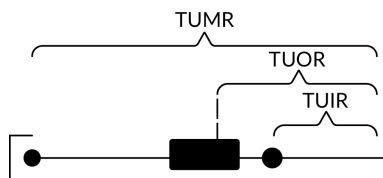
Home Base		<ul style="list-style-type: none"> <li>• D/L Waypoint Representing Home Base</li> </ul>
Waypoint		<ul style="list-style-type: none"> <li>• D/L Generic Waypoint</li> </ul>
Data Link Fixed Point		<ul style="list-style-type: none"> <li>• D/L Waypoint Representing Fixed Point</li> </ul>
Surface Target		<ul style="list-style-type: none"> <li>• D/L Waypoint Representing a Surface Target</li> </ul>

## POS SYMB MODIFIERS

Mandatory Attack		<ul style="list-style-type: none"> <li>• <b>Additional Symbology on TWS Track</b> <ul style="list-style-type: none"> <li>– Horizontal bar through center dot</li> </ul> </li> <li>• <b>Selected by RIO</b> <ul style="list-style-type: none"> <li>– Only 1 target can be designated</li> <li>– Guaranteed WCS priority number</li> </ul> </li> </ul>
Data Link Destroy		<ul style="list-style-type: none"> <li>• <b>Additional Symbology on D/L Track</b> <ul style="list-style-type: none"> <li>– Horizontal bar through center dot</li> </ul> </li> <li>• <b>Selected by Source</b> <ul style="list-style-type: none"> <li>– No effect on WCS prioritization</li> </ul> </li> </ul>
Do Not Attack		<ul style="list-style-type: none"> <li>• <b>Additional Symbology on TWS or D/L Track</b> <ul style="list-style-type: none"> <li>– Vertical bar through center dot</li> </ul> </li> <li>• <b>If Set by RIO</b> <ul style="list-style-type: none"> <li>– Removes WCS prioritization</li> </ul> </li> </ul>
Multiple Targets		<ul style="list-style-type: none"> <li>• <b>Additional Symbology on TWS or D/L Track</b> <ul style="list-style-type: none"> <li>– Horizontal bar on left side of symbol</li> </ul> </li> <li>• <b>Indicates Multiple Targets</b></li> </ul>

Data Link Challenge		<ul style="list-style-type: none"> <li>• <b>Additional Symbolology on D/L Track</b> <ul style="list-style-type: none"> <li>– Small <b>V</b> with center at center dot</li> </ul> </li> <li>• <b>Command to Visually Identify</b></li> </ul>
Track Extrapolated		<ul style="list-style-type: none"> <li>• <b>Additional Symbolology on TWS or D/L Track</b> <ul style="list-style-type: none"> <li>– Small <b>X</b> with center at center dot</li> </ul> </li> <li>• <b>No Update within 8 seconds</b> <ul style="list-style-type: none"> <li>– Track deleted after 14 seconds</li> <li>– Or after 2 min if track hold</li> </ul> </li> </ul>
Altitude Numerics		<ul style="list-style-type: none"> <li>• <b>Altitude to Nearest Ten Thousand</b> <ul style="list-style-type: none"> <li>– example: 35000-45000</li> </ul> </li> </ul>
Firing Order Numerics		<ul style="list-style-type: none"> <li>• <b>Indicates AIM-54 Prioritization</b> <ul style="list-style-type: none"> <li>– Numbers 1-6</li> <li>– Only in TWS</li> </ul> </li> </ul>
Time-to-Impact (TTI)		<ul style="list-style-type: none"> <li>• <b>After AIM-54 Launch</b> <ul style="list-style-type: none"> <li>– Prioritization replaced with estimated TTI</li> </ul> </li> <li>• <b>Flashes after Pitbull</b></li> </ul>
Velocity Vector		<ul style="list-style-type: none"> <li>• <b>Additional Symbolology from center Dot</b> <ul style="list-style-type: none"> <li>– Direction represents track heading</li> <li>– Length represents speed</li> </ul> </li> <li>• <b>Varies with Mode</b> <ul style="list-style-type: none"> <li>– Ground Stabilized: true heading and ground speed</li> <li>– Aircraft Stabilized: relative heading and velocity</li> </ul> </li> </ul>



**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 Symbolology on D/L Track**

- Square
- Indicates target must be destroyed
- No effect on WCS prioritization

### ATTACK DISPLAY SYMBOLOLOGY

**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**

## Chapter 4

# TCS - LANTIRN

### Contents

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## **4.1 TCS**

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### **4.1.1 OVERVIEW**



## 4.2 LANTIRN

### 4.2.1 OVERVIEW

• <b>LANTIRN</b>	<p>Low <b>Altitude Navigation and Targeting Infra-Red</b> for <b>Night</b></p> <ul style="list-style-type: none"> <li>• <b>Only Targeting Pod</b> – Nav pod was deleted</li> <li>• <b>Incomplete Integration</b> – Own control panel, supplants TCS feed</li> </ul>
• <b>Master Modes</b>	<ul style="list-style-type: none"> <li>• <b>A/G</b> – Allows bomb release guidance</li> <li>• <b>A/A</b> – Optimized for air targets</li> </ul>
• <b>FOV Levels Overview</b>	<ul style="list-style-type: none"> <li>• <b>Wide</b> <ul style="list-style-type: none"> <li>– <b>FOV</b> – 5.9 deg</li> <li>– <b>Slew</b> – 8.5 deg/s</li> </ul> </li> <li>• <b>Narrow</b> <ul style="list-style-type: none"> <li>– <b>FOV</b> – 1.7 deg</li> <li>– <b>Slew</b> – 1.8 deg/s</li> </ul> </li> <li>• <b>Expanded</b> <ul style="list-style-type: none"> <li>– <b>FOV</b> – 0.8 deg</li> <li>– <b>Slew</b> – 0.7 deg/s</li> <li>– <b>Digital Zoom</b> – Degraded quality</li> </ul> </li> </ul>

### 4.2.2 OVERVIEW - STARTUP

1. <b>Power Switch</b>	<b>POD</b>
2. <b>Pod Startup Sequence</b>	<ul style="list-style-type: none"> <li>• 8 min startup sequence</li> <li>• <b>MODE Switch</b> shows <b>STBY</b> when complete</li> </ul>
3. <b>MODE Switch</b>	<b>Press</b>
4. <b>Initialization Sequence</b>	<ul style="list-style-type: none"> <li>• 30 sec initialization</li> <li>• <b>MODE Switch</b> shows <b>OPER</b> when ready</li> </ul>
5. <b>VIDEO Switch</b>	<b>FLIR</b>
6. <b>TID MODE</b>	<b>TV</b>

## 4.2.3 OVERVIEW - POINTING MODES

<ul style="list-style-type: none"> <li>• <b>Sensor Modes Overview</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Contrast Lock</b> <ul style="list-style-type: none"> <li>– Area Track</li> <li>– Point Track</li> </ul> </li> <li>• <b>Q Designation</b> <ul style="list-style-type: none"> <li>– <b>Directional Q</b> – QSNO / QADL / QHUD</li> <li>– <b>Location Q</b> – QWp / QDES</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>Directional Q</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Do Not Allow Weapon Guidance</b></li> <li>• <b>QSNO</b> <ul style="list-style-type: none"> <li>– Pod slaved to <b>ground 15 nm in front</b> along own aircraft heading</li> </ul> </li> <li>• <b>QADL</b> <ul style="list-style-type: none"> <li>– <b>Pod slaved to ADL</b></li> <li>– In A/A mode</li> </ul> </li> <li>• <b>QHUD</b> <ul style="list-style-type: none"> <li>– <b>Pod slaved to HUD</b></li> <li>– In A/G mode</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>Location Q</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Allow Weapon Guidance</b></li> <li>• <b>QWp</b> <ul style="list-style-type: none"> <li>– Pod slaved to WCS waypoint</li> <li>– Cycled with <b>QWp+</b> / <b>QWp-</b></li> </ul> </li> <li>• <b>QDES</b> <ul style="list-style-type: none"> <li>– <b>Designate targets for engagement</b></li> <li>– <b>LANTIRN Trigger Second Detent</b> to designate</li> <li>– Coordinates can be manually added to WCS for navigation</li> </ul> </li> </ul>



## 4.2.4 OVERVIEW - LASING/DESIGNATION

• <b>A/G Designation</b>	(a) <b>Designate</b> ..... <b>Trigger Full-Action</b> <ul style="list-style-type: none"> <li>• Laser Fires</li> <li>• Slant Range calculated</li> <li>• Time-to-Go calculated</li> </ul>
• <b>Steering Cues</b>	<ul style="list-style-type: none"> <li>• <b>Automatically activated when QDES selected/designated</b></li> <li>• QDES remains even if new Q selected</li> <li>• Cues still point towards QDES even if pod at another point</li> </ul>
• <b>Manual Lase</b>	(a) <b>Lase</b> ..... <b>Trigger Half-Action Hold</b>
• <b>Latched Lase</b>	<ul style="list-style-type: none"> <li>• <b>Effect</b> – Lases for 60 sec</li> </ul> <p>(a) <b>Activate</b> ..... <b>Latch Lase Button Press</b>  (b) <b>Extend</b> ..... <b>Latch Lase Button Press</b>  (c) <b>Deactivate</b> ..... <b>Trigger Half-Action</b></p>
• <b>Auto Lase</b>	<ul style="list-style-type: none"> <li>• <b>Effect</b> – Fires from -10 to +4 sec TIMP</li> </ul> <p>(a) <b>Laser Mode</b> ..... <b>Slider AFT Short</b>  (b) <b>Cycle A/M</b> ..... <b>Right 4-Way Depress</b></p>
• <b>Laser Notes</b>	<ul style="list-style-type: none"> <li>• <b>Always at current Pod location</b></li> <li>• Can point to different location than QDES</li> </ul>

## 4.2.5 CONTROLS - PANEL

• <b>Power Switch</b>	<ul style="list-style-type: none"> <li>• <b>OFF</b> – Disables power to system</li> <li>• <b>IMU</b> – Only powers LANTIRN IMU (Not Simulated in DCS)</li> <li>• <b>POD</b> – Powers whole system</li> </ul>
• <b>MODE Switch</b>	<ul style="list-style-type: none"> <li>• <b>STBY</b> – Standby</li> <li>• <b>OPER</b> – Operational</li> </ul>
• <b>LASER Switch</b>	<ul style="list-style-type: none"> <li>• <b>ARM</b> – Arms laser</li> <li>• <b>SAFE</b> – Inhibits laser use</li> </ul>
• <b>VIDEO Switch</b>	<ul style="list-style-type: none"> <li>• <b>FLIR</b> – Displays LANTIRN FLIR on TID</li> <li>• <b>TCS</b> – Displays TCS video on TID</li> </ul>
• <b>Indicator Light</b>	• <b>Indicate Error States</b>
• <b>IBIT Button</b>	• <b>Initiates Build-In-Test</b>

## 4.2.6 CONTROLS - STICK

• <b>Master Mode</b>	<ul style="list-style-type: none"> <li>• A/G Mode – Side 2-Way FWD</li> <li>• A/A Mode – Side 2-Way AFT</li> </ul>
• <b>Slew</b>	Center Slew Hat
• <b>WHOT/BHOT</b>	Center Slew Hat Depress
• <b>Contrast Track</b>	<ul style="list-style-type: none"> <li>• Point Track – Left 4-Way Up</li> <li>• Area Track – Left 4-Way Down</li> </ul>
• <b>Q Select</b>	<ul style="list-style-type: none"> <li>• QADL/QHUD – Right 4-Way Up</li> <li>• QDES – Right 4-Way Right</li> <li>• QSNO – Right 4-Way Down</li> </ul>
• <b>Declutter</b>	Right 4-Way Depress
• <b>Zoom Level</b>	FOV Button
• <b>Cycle Gain</b> <b>Control Mode</b>	Slider FWD short
• <b>Manual Gain</b> <b>Control</b>	(a) Slider ..... FWD long (b) Gain ..... Right 4-Way Up/Down Level ..... Right 4-Way Left/Right
• <b>Laser Code</b>	(a) Slider ..... AFT short (b) Select Digit ..... Right 4-Way Left/Right (c) Change Digit ..... Right 4-Way Up/Down
• <b>Focus Control</b>	(a) Slider ..... AFT hold (b) Right 4-Way ..... Up/Down
• <b>Manual Lase</b>	Trigger Half-Action
• <b>Latched Laser</b>	Latched Laser Fire Button
• <b>Designate</b> <b>QDES</b>	Trigger Full-Action

## 4.2.7 DISPLAY

• <b>Top Left</b>	<ul style="list-style-type: none"> <li>• <b>Own Aircraft Datablock</b> <ul style="list-style-type: none"> <li>- <b>Lat</b> – deg:min.dec</li> <li>- <b>Long</b> – deg:min.dec</li> <li>- <b>ALT</b> – Altitude (ft)</li> <li>- <b>KGS</b> – Knots Ground Speed</li> <li>- <b>DIVE</b> – Dive Angle (deg)</li> </ul> </li> </ul>
• <b>Mid Left</b>	<ul style="list-style-type: none"> <li>• <b>Sensor Mode</b> – <b>WHOT</b> / <b>BHOT</b></li> <li>• <b>Gain Control</b> – <b>Auto</b> / <b>Manual</b></li> </ul>
• <b>Bottom Left</b>	<ul style="list-style-type: none"> <li>• <b>Pod Info Datablock</b> <ul style="list-style-type: none"> <li>- <b>SRA</b> – Slant Range</li> <li>- <b>AZ</b> – Pod LoS Azimuth L/R</li> <li>- <b>EL</b> – Pod LoS Elevation</li> <li>- <b>Time</b> – UTC Time</li> <li>- <b>IBIT</b> – Codes</li> </ul> </li> </ul>
• <b>Bottom Center</b>	<ul style="list-style-type: none"> <li>• <b>Master Mode</b> – <b>A/A</b> / <b>A/G</b></li> <li>• <b>Track Mode</b> – <b>AREA</b> / <b>POINT</b> / <b>Q</b></li> <li>• <b>Current Weapon</b></li> <li>• <b>Laser Code</b></li> <li>• <b>L</b> <ul style="list-style-type: none"> <li>- <b>Steady</b> – Laser Armed</li> <li>- <b>Flashing</b> – Laser Firing</li> </ul> </li> </ul>
• <b>Bottom Right</b>	<ul style="list-style-type: none"> <li>• <b>Q Datablock</b> <ul style="list-style-type: none"> <li>- <b>TTG</b> – Time-To-Go</li> <li>- <b>B/R</b> – Bearing and Range</li> <li>- <b>ELEV</b> – Elevation (ft) of Q</li> <li>- <b>Lat</b> – deg:min:dec</li> <li>- <b>Long</b> – deg:min:dec</li> </ul> </li> </ul>
• <b>Mid Center</b>	<ul style="list-style-type: none"> <li>• <b>Crosshair</b> <ul style="list-style-type: none"> <li>- <b>Bounding Box</b> – Indicates currently tracked target in point mode</li> <li>- <b>Zoom Boxes</b> – Indicates next zoom levels</li> <li>- <b>FLIR Pointing Cue</b> – Shows Pod LoS, screen center indicates straight down</li> </ul> </li> </ul>

- **Mid Right**

- **Bomb Release 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

## Chapter 5

# A/G WEAPONS

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**A/G**

## 5.1 SETTINGS

### 5.1.1 A/G WEAPON SETTINGS - OVERVIEW

• <b>WPN TYPE</b>	<ul style="list-style-type: none"> <li>• <b>Selects Weapon Type</b> <ul style="list-style-type: none"> <li>– Configures WCS for selected weapon</li> <li>– Refer to Kneeboard for list of mounted weapons</li> <li>– Mk-81 / 82 / 83 have both <b>L</b> and <b>H</b> option referring to high and low drag</li> </ul> </li> </ul>
• <b>DLVY MODE</b>	<ul style="list-style-type: none"> <li>• <b>STP-SGL</b> – Single weapon per press</li> <li>• <b>STP-PRS</b> Single pair per press</li> <li>• <b>RPL-SGL</b> – QTY of weapons per press</li> <li>• <b>RPL-PRS</b> – QTY of pairs per press</li> </ul>
• <b>DLVY OPTNS</b>	<ul style="list-style-type: none"> <li>• <b>INTERVAL</b> – Interval in ms</li> <li>• <b>QTY</b> – Number of stores to be released</li> </ul>
• <b>MECH FUZE</b>	<ul style="list-style-type: none"> <li>• <b>NOSE</b> – Arms nose fuze</li> <li>• <b>SAFE</b> – Inhibits arming of fuzes</li> <li>• <b>NOSE/TAIL</b> – Arms both fuzes</li> </ul>
• <b>ELEC FUZE</b>	<ul style="list-style-type: none"> <li>• <b>SAFE</b> – Inhibits electrical bomb fuzing</li> <li>• <b>VT</b> – Sets air-burst mode at preset burst height for compatible stores</li> <li>• <b>INST</b> – Sets instantaneous burst mode</li> <li>• <b>DLY 1</b> – Sets preset time delay 1</li> <li>• <b>DLY 2</b> – Sets preset time delay 2</li> </ul>
• <b>STA SEL</b>	<ul style="list-style-type: none"> <li>• <b>Selects Stations for Employment/Jettison</b> <ul style="list-style-type: none"> <li>– Set to <b>SEL</b> to activate a pylon</li> <li>– Stations 1 &amp; 8 should be set to <b>B</b> for selection</li> <li>– Station 1 &amp; 8 <b>SW</b> was used for Sidewinder jettison, is now inoperable</li> </ul> </li> </ul>
• <b>TANK JETT</b>	<ul style="list-style-type: none"> <li>• <b>Allows Drop Tank Jettison</b></li> </ul>
• <b>SEL JETT</b>	<ul style="list-style-type: none"> <li>• <b>JETT</b> – Selective jettison</li> <li>• <b>SAFE</b> – Inhibits jettison</li> <li>• <b>AUX</b> – Backup mode</li> </ul>
• <b>JETT OPTIONS</b>	<ul style="list-style-type: none"> <li>• <b>MER TER</b> – Jettisons ejector racks</li> <li>• <b>WPNS</b> – Jettisons weapons only</li> </ul>

- **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**

### 5.1.2 SELECTIVE ORNANCE JETTISON

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

## 5.2 UNGUIDED

### 5.2.1 M61 GUN

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



## 5.2.2 FFAR / ZUNI ROCKETS

1. <b>RIO Conditions</b>	<ul style="list-style-type: none"> <li>• WPN TYP ..... LAU-10</li> <li>• Attack Mode ..... Pilot Attack</li> <li>• Deliver Mode ..... RPL-SGL</li> <li>• Mechanical Fuze ..... NOSE</li> <li>• Electronic Fuze ..... INST</li> <li>• Delivery Options ..... As Desired</li> <li>• Stations ..... Armed</li> </ul>
2. <b>Pilot Conditions</b>	<ul style="list-style-type: none"> <li>• MASTER ARM ..... ON</li> <li>• HUD ..... A/G</li> <li>• WEAPON SELECTOR ..... OFF</li> <li>• Stations ..... verify selected</li> <li>• Wing Sweep ..... BOMB</li> </ul>
3. <b>Employment</b>	<ul style="list-style-type: none"> <li>(a) Dive ..... 20-30 deg</li> <li>(b) Pipper ..... on target</li> <li>(c) TRIGGER ..... FIRE</li> </ul>

## 5.2.3 UNGUIDED BOMB - CCIP

1. <b>RIO Conditions</b>	<ul style="list-style-type: none"> <li>• WPN TYP ..... MK-8X</li> <li>• Attack Mode ..... Pilot Attack</li> <li>• Deliver Mode ..... STP-PRS</li> <li>• Mechanical Fuze ..... NOSE</li> <li>• Electronic Fuze ..... INST</li> <li>• Delivery Options ..... As Desired</li> <li>• Stations ..... Armed</li> </ul>
2. <b>Pilot Conditions</b>	<ul style="list-style-type: none"> <li>• MASTER ARM ..... ON</li> <li>• HUD ..... A/G</li> <li>• WEAPON SELECTOR ..... OFF</li> <li>• Stations ..... verify selected</li> <li>• Wing Sweep ..... BOMB</li> </ul>
3. <b>Employment</b>	<ul style="list-style-type: none"> <li>(a) Dive ..... 40 deg</li> <li>(b) Pipper ..... on target</li> <li>(c) STORE RELEASE ..... Press and Hold</li> </ul>

## 5.2.4 UNGUIDED BOMB - CCRP

1. <b>RIO Conditions</b>	<ul style="list-style-type: none"> <li>• <b>WPN TYP</b> ..... <b>MK-8X</b></li> <li>• <b>Attack Mode</b> ..... <b>Target Attack</b></li> <li>• <b>Deliver Mode</b> ..... <b>STP-PRS</b></li> <li>• <b>Mechanical Fuze</b> ..... <b>NOSE</b></li> <li>• <b>Electronic Fuze</b> ..... <b>INST</b></li> <li>• <b>Delivery Options</b> ..... <b>As Desired</b></li> <li>• <b>Stations</b> ..... <b>Armed</b></li> </ul>
2. <b>Pilot Conditions</b>	<ul style="list-style-type: none"> <li>• <b>MASTER ARM</b> ..... <b>ON</b></li> <li>• <b>HUD</b> ..... <b>A/G</b></li> <li>• <b>WEAPON SELECTOR</b> ..... <b>OFF</b></li> <li>• <b>Stations</b> ..... verify selected</li> <li>• <b>Wing Sweep</b> ..... <b>BOMB</b></li> </ul>
3. <b>Designation</b>	(a) <b>Slew Diamond</b> ..... <b>VSL HI/LO</b> (b) <b>Designate</b> ..... <b>PAL</b>
4. <b>Employment</b>	(a) <b>Flight Path</b> ..... Straight, Level (b) <b>Vel Vector</b> ..... on Bomb Fall Line  When Solution Cue meets Velocity Vector  (c) <b>STORE RELEASE</b> ..... <b>Press and Hold</b>

## 5.3 GUIDED

## 5.3.1 LASER GUIDED BOMB

1. <b>LANTIRN PREP</b>	(a) <b>Target Pod Power</b> ..... <b>POD</b> <ul style="list-style-type: none"> <li>• Warm up takes approx. 8 min</li> <li>• Automatically switches to <b>STANDBY</b></li> </ul> (b) <b>Laser Code</b> ..... as desired <ul style="list-style-type: none"> <li>• <b>MUST BE SET ON THE GROUND</b></li> <li>• <b>Default:</b> 1688</li> </ul> (c) <b>LANTIRN Mode</b> ..... <b>OPERATE</b> <ul style="list-style-type: none"> <li>• <b>STANDBY</b> caution will flash for 30 s</li> <li>• Then switches to <b>OPER</b></li> </ul> (d) <b>VIDEO Switch</b> ..... <b>FLIR</b>
2. <b>RIO Conditions</b>	(e) <b>TID Mode</b> ..... <b>TV</b> <ul style="list-style-type: none"> <li>• <b>WPN TYP</b> ..... <b>GBU-XX</b></li> <li>• <b>Attack Mode</b> ..... <b>Manual</b></li> <li>• <b>Deliver Mode</b> ..... <b>STP-SGL</b></li> <li>• <b>Mechanical Fuze</b> ..... <b>NOSE</b></li> <li>• <b>Electronic Fuze</b> ..... <b>INST</b></li> <li>• <b>Delivery Options</b> ..... <b>As Desired</b></li> <li>• <b>Stations</b> ..... <b>Armed</b></li> </ul>
3. <b>Pilot Conditions</b>	<ul style="list-style-type: none"> <li>• <b>MASTER ARM</b> ..... <b>ON</b></li> <li>• <b>HUD</b> ..... <b>A/G</b></li> <li>• <b>WEAPON SELECTOR</b> ..... <b>OFF</b></li> <li>• <b>VDI Mode</b> ..... <b>TV</b></li> <li>• <b>Stations</b> ..... verify selected</li> <li>• <b>Wing Sweep</b> ..... <b>BOMB</b></li> </ul>
4. <b>Slew LANTIRN</b>	Refer to LANTIRN Control Section <ul style="list-style-type: none"> <li>• <b>Slave to WYPT</b> ..... <b>Left-4-Way RIGHT</b></li> <li>• <b>QSNO (Snowplow)</b> ..... <b>S4 HAT Down</b></li> <li>• <b>Toggle FOV</b> ..... <b>LANTIRN Toggle FOV</b></li> <li>• <b>Slew</b> ..... <b>LANTIRN Stick</b></li> <li>• <b>Area Track</b> ..... <b>Left-4-Way UP</b></li> <li>• <b>Point Track</b> ..... <b>Left-4-Way Down</b></li> <li>• <b>Undesignate</b> ..... <b>LANTIRN Undesignate</b></li> </ul>

4. <b>Designate</b>	<p>Refer to LANTIRN Designation Section</p> <p>(a) <b>Designate</b> ..... <b>Trigger Full-Action</b></p> <ul style="list-style-type: none"> <li>• Slant Range calculated</li> <li>• Time-to-Go calculated</li> </ul> <p><b>Once Time-to-Release (TREL) is 0</b></p> <p>(b) <b>Auto-Lase</b> .. If selected: lases 10s to impact</p> <p>(c) <b>Manual Lase</b> ..... <b>Trigger Full-Action</b></p> <p>(d) <b>While Lasing</b> ..... <b>L</b> blinks</p>
5. <b>Employment</b>	<p><b>Once Time-to-Release (TREL) is 0</b></p> <p>(a) <b>STORE RELEASE</b> ..... <b>Press and Hold</b></p> <p>(b) <b>Flight Path</b> ..... Gentle right-hand turn (to prevent masking)</p>

### 5.3.2 TALD DECOYS

1. <b>RIO Conditions</b>	<ul style="list-style-type: none"> <li>• <b>WPN TYP</b> ..... <b>TALD</b></li> <li>• <b>Deliver Mode</b> ..... <b>STP-SGL</b></li> <li>• <b>Delivery Options</b> ..... <b>As Desired</b></li> <li>• <b>Stations</b> ..... <b>Armed</b></li> </ul>
2. <b>Pilot Conditions</b>	<ul style="list-style-type: none"> <li>• <b>MASTER ARM</b> ..... <b>ON</b></li> <li>• <b>HUD</b> ..... <b>A/G</b></li> <li>• <b>WEAPON SELECTOR</b> ..... <b>OFF</b></li> <li>• <b>HSD Mode</b> ..... <b>TID</b></li> <li>• <b>Stations</b> ..... verify selected</li> </ul>
3. <b>Employment</b>	<p>(a) <b>Flight Path</b> ..... High / Fast</p> <p>(b) <b>RWR</b> ..... Monitor to locate emitters</p> <p>(c) <b>STORE RELEASE</b> ..... <b>Press and Hold</b></p>

## Chapter 6

# A/A WEAPONS

### Contents

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## 6.1 M61 GUN

### 6.1.1 M61 GUN - OVERVIEW

• <b>GUN RATE Button</b>	<ul style="list-style-type: none"> <li>• <b>Cycles Gun Rate</b> <ul style="list-style-type: none"> <li>– <b>HIGH</b> – 6000 rpm</li> <li>– <b>LOW</b> – 4000 rpm</li> </ul> </li> </ul>
• <b>A/A Gun Modes</b>	<ul style="list-style-type: none"> <li>• <b>RTGS</b> <ul style="list-style-type: none"> <li>– <b>Real-Time Gunsight Mode</b></li> <li>– Selected automatically with guns</li> <li>– <b>If No WCS Data Available</b> displays bullet location at 2000 ft with diamond and 1000 ft with pipper</li> <li>– <b>If WCS Data Available</b> pipper displays bullet location at targets current range out to 4000 ft</li> </ul> </li> <li>• <b>MANUAL</b> <ul style="list-style-type: none"> <li>– Fixed manual pipper</li> <li>– Adjust with <b>GUN ELEV</b> knob</li> <li>– Press <b>CAGE/SEAM</b> to select</li> </ul> </li> </ul>
• <b>CAGE/SEAM Button</b>	• <b>Cycles RTGS / MANUAL Gun Modes</b>
• <b>ROUNDS Knob</b>	• <b>Allows selection of remaining gun rounds</b>

**6.1.2 M61 GUN - MANUAL**

1. <b>Pilot Conditions</b>	<ul style="list-style-type: none"> <li>• MASTER ARM ..... ON</li> <li>• HUD ..... A/A</li> <li>• Gun Rate ..... HIGH</li> <li>• Gunsight Lead ..... as required</li> <li>• WEAPON SELECTOR ..... GUNS</li> </ul>
2. <b>Employment</b>	<ul style="list-style-type: none"> <li>(a) Gun Mode ..... MANUAL</li> <li>(b) Pipper ..... on target</li> <li>(c) Trigger ..... FIRE</li> </ul>

**6.1.3 M61 GUN - RTGS / NO RADAR**

1. <b>Pilot Conditions</b>	<ul style="list-style-type: none"> <li>• MASTER ARM ..... ON</li> <li>• HUD ..... A/A</li> <li>• Gun Rate ..... HIGH</li> <li>• WEAPON SELECTOR ..... GUNS</li> </ul>
2. <b>Employment</b>	<ul style="list-style-type: none"> <li>(a) Gun Mode ..... RTGS</li> <li>(b) Pipper ..... on target</li> <li>(c) Trigger ..... FIRE</li> </ul>

**6.1.4 M61 GUN - RTGS / RADAR**

1. <b>Pilot Conditions</b>	<ul style="list-style-type: none"> <li>• MASTER ARM ..... ON</li> <li>• HUD ..... A/A</li> <li>• Gun Rate ..... HIGH</li> <li>• WEAPON SELECTOR ..... GUNS</li> </ul>
2. <b>Employment</b>	<ul style="list-style-type: none"> <li>(a) Gun Mode ..... RTGS</li> <li>(b) Radar ..... STT</li> <li>(c) Pipper ..... on target</li> <li>(d) Trigger ..... FIRE</li> </ul>



## 6.2 AIM-9 SIDEWINDER

### 6.2.1 AIM-9 - 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

**6.2.2 AIM-9 - SILENT**

1. <b>Pilot Conditions</b>	<ul style="list-style-type: none"> <li>• MASTER ARM ..... ON</li> <li>• HUD ..... A/A</li> <li>• SW COOL ..... ON</li> <li>• MODE/STP ..... As Desired</li> <li>• WEAPON SELECTOR ..... SW</li> </ul>
2. <b>Employment</b>	<ul style="list-style-type: none"> <li>(a) CAGE/SEAM ..... Uncage Seeker</li> <li>(b) IR-Lock ..... Good Tone</li> <li>(c) Trigger ..... FIRE</li> </ul>

**6.2.3 AIM-9 - RADAR**

1. <b>Pilot Conditions</b>	<ul style="list-style-type: none"> <li>• MASTER ARM ..... ON</li> <li>• HUD ..... A/A</li> <li>• SW COOL ..... ON</li> <li>• MODE/STP ..... NORM</li> <li>• WEAPON SELECTOR ..... SW</li> </ul>
2. <b>Employment</b>	<ul style="list-style-type: none"> <li>(a) Radar ..... STT</li> <li>(b) CAGE/SEAM ..... Slave Seeker</li> <li>(c) IR-LOCK ..... Good Tone</li> <li>(d) Steering ..... center T-shaped cue with ASE</li> <li>(e) Trigger ..... FIRE</li> </ul>

## 6.3 AIM-7 SPARROW

### 6.3.1 AIM-7 - OVERVIEW

<ul style="list-style-type: none"> <li>• <b>Missile Preparation</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>MSL PREP</b> <ul style="list-style-type: none"> <li>- AIM-7 must be tuned to AWG-9</li> <li>- Either press <b>MSL PREP</b> button</li> <li>- Or activation of <b>ACM</b></li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>Launch Modes</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Normal</b> <ul style="list-style-type: none"> <li>- Standard operation, STT target designated before launch</li> <li>- AIM-7 uses SARH all the way to target</li> <li>- WCS can use CS or PD for guidance set with <b>MSL OPTIONS</b> Switch</li> </ul> </li> <li>• <b>Boresight</b> <ul style="list-style-type: none"> <li>- Uses CS flood antenna of AWG-9</li> <li>- Missile will <b>track strongest return</b> in Flood area</li> <li>- Automatically activated if STT broken</li> <li>- Selected if <b>MODE/STP</b> set to <b>BRSIT</b></li> <li>- <b>Or if no STT available</b></li> <li>- <b>Shown Below</b></li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>MSL SPD GATE Switch</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>NOSE QTR</b> <ul style="list-style-type: none"> <li>- Standard setting in DCS</li> </ul> </li> <li>• <b>All Others</b> <ul style="list-style-type: none"> <li>- Not simulated</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>MSL OPTIONS Switch</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>NORM</b> <ul style="list-style-type: none"> <li>- WCS uses dedicated CW antenna for AIM-7 guidance</li> </ul> </li> <li>• <b>SP PD</b> <ul style="list-style-type: none"> <li>- WCS uses PD from main flood antenna for AIM-7F/M guidance</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>MODE/STP Switch</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>NORM</b> <ul style="list-style-type: none"> <li>- Sets normal launch mode logic</li> </ul> </li> <li>• <b>BRSIT</b> <ul style="list-style-type: none"> <li>- Forces Boresight launch mode</li> </ul> </li> </ul>



- MASTER ARM ..... ON
- HUD ..... A/A
- MSL PREP ..... ON
- MODE/STP ..... NORM
- WEAPON SELECTOR ..... SP

- MSL SPD GATE ..... NOSE QTR
- MSL OPTIONS ..... As Desired

- (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)

## 6.4 AIM-54 PHOENIX

### 6.4.1 AIM-54 - 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

<ul style="list-style-type: none"> <li>• <b>MSL OPTIONS</b> Switch</li> </ul>	<ul style="list-style-type: none"> <li>• <b>NORM</b> <ul style="list-style-type: none"> <li>– Normal guidance (SARH or SARH/ARH)</li> </ul> </li> <li>• <b>PH ACT</b> <ul style="list-style-type: none"> <li>– WCS immediately sends AIM-54 activation command on launch</li> <li>– Reverts to SARH if no target detected</li> <li>– <b>Must be selected before launch</b></li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>TGTS</b> Switch</li> </ul>	<ul style="list-style-type: none"> <li>• <b>SMALL</b> – 6nm activation range</li> <li>• <b>NORM</b> – 10nm activation range</li> <li>• <b>LARGE</b> – 13nm activation range</li> </ul>
<ul style="list-style-type: none"> <li>• <b>Missile Next</b> Launch Button</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Selects Hooked Track as Next Target for AIM-54 TWS Engagement</b></li> </ul>
<ul style="list-style-type: none"> <li>• <b>MODE/STP</b> Switch</li> </ul>	<ul style="list-style-type: none"> <li>• <b>NORM</b> <ul style="list-style-type: none"> <li>– Normal operation</li> </ul> </li> <li>• <b>BRSIT</b> <ul style="list-style-type: none"> <li>– Commanded active <b>before launch</b></li> <li>– Missile follows ADL and locks strongest return</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>TWS Symbology</b></li> </ul>	<p><b>Refer to TID Symbology Section</b></p> <ul style="list-style-type: none"> <li>• <b>Pre-Launch</b> <ul style="list-style-type: none"> <li>– Prioritization numbers assigned to tracks automatically or manually</li> <li>– Blinking indicates optimal launch parameters</li> </ul> </li> <li>• <b>Post-Launch</b> <ul style="list-style-type: none"> <li>– Target prioritization number replaced with TTI</li> <li>– Other prioritization numbers collapsed by one</li> <li>– Tracks under missile attack brightened</li> <li>– <b>TTI blinks when missile active</b></li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>• <b>Launch To Eject (LTE) Time</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Normal Operation</b> – 3-4 seconds</li> <li>• <b>When in ACM</b> – 1 second</li> </ul>

## 6.4.2 AIM-54 - PD-STT

1. <b>Pilot Conditions</b>	<ul style="list-style-type: none"> <li>• MASTER ARM ..... ON</li> <li>• HUD ..... A/A</li> <li>• MSL PREP ..... ON</li> <li>• MODE/STP ..... NORM</li> <li>• WEAPON SELECTOR ..... PH</li> </ul>
2. <b>RIO Conditions</b>	<ul style="list-style-type: none"> <li>• LIQUID COOLING ..... ON (FWD)</li> <li>• MSL SPD GATE ..... NOSE QTR</li> <li>• MSL OPTIONS ..... As Desired</li> <li>• TGT Switch ..... As Desired</li> </ul>
3. <b>Employment</b>	<p>(a) Radar ..... STT</p> <p>(b) Steering</p> <ul style="list-style-type: none"> <li>• Target &lt; 20 deg from ADL</li> <li>• ASE center T-shaped cue within</li> </ul> <p>(c) Trigger ..... Press and Hold (until weapon release)</p> <p>(d) Radar ..... Maintain Lock (until impact)</p>

## 6.4.3 AIM-54 - TWS / MULTI

1. <b>Pilot Conditions</b>	<ul style="list-style-type: none"> <li>• MASTER ARM ..... ON</li> <li>• HUD ..... A/A</li> <li>• MSL PREP ..... ON</li> <li>• MODE/STP ..... NORM</li> <li>• WEAPON SELECTOR ..... PH</li> </ul>
2. <b>RIO Conditions</b>	<ul style="list-style-type: none"> <li>• LIQUID COOLING ..... ON (FWD)</li> <li>• MSL SPD GATE ..... NOSE QTR</li> <li>• MSL OPTIONS ..... As Desired</li> <li>• TGT Switch ..... As Desired</li> <li>• WCS Mode ..... TWS MAN/AUTO</li> </ul>
4. <b>Employment</b>	<p>(a) Radar ..... TWS</p> <p>(b) Trigger ..... Press and Hold (until weapon release)</p> <p>(c) Repeat ..... for remaining targets</p> <p>(d) Radar ..... Maintain Track (until active)</p>





