

Pocket Checklist

F-14A/B AIRCRAFT

REV: 20220616



Procedures

Systems

AWG-9
Radar

TCS
LANTIRN

A/G
Weapons

A/A
Weapons



DISCLAIMER

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Chapter 1

PROCEDURES

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1.1 START-UP

1.1.1 PILOT - PRE-START

1.	Parking Brake	ENGAGED
2.	Ground Crew	(a) Ground Powerconnected (b) Compressed Airconnected
3.	ICS	HOT MIC
4.	TO RIO	<i>"Begin Start-Up"</i>
5.	ICS	Comm Check
6.	MASTER TEST Selector	(a) LTS <ul style="list-style-type: none"> • Warning Lightschecked • Caution Lightschecked • Advisory Lights checked (b) FIRE DET/EXT <ul style="list-style-type: none"> • L FIRE GO illuminated • R FIRE GO illuminated (c) INST <ul style="list-style-type: none"> • RPM96% • EGT960 C • FF10500 pph • AOA18 ± 5 • Wing Sweep45 ± 2.5 • FUEL QTY2000 ± 200 • Oxygen QTY 2 liters • L&R FF lights illuminated (d) OFF
7.	Ejection Seat	Armed
8.	RIO	Canopy Closed
9.	Oxygen	ON (FWD)
10.	Emergency Wing Sweep	OVERSWEEP

1.1.2 PILOT - ENGINE START

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

1.1.3 PILOT - POST-START

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

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

WARNING

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

1.1.4 RIO - PRE-START

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

1.1.5 RIO - POST-START - SHORE

1. PILOT	<ul style="list-style-type: none"> • Engines started • AIR SOURCE BOTH ENG
2. INS STARTUP	(a) LIQUID COOLING ON (FWD) (b) WCS Switch STANDBY (c) IR/TV Power STBY/IR/TV (d) TID/DDD illuminated after 40 s
3. Kneeboard	Retrieve Coordinates, Elevation, Magnetic Variation from GROUND SETTINGS Page
4. Start INS Align	(a) Nav Mode GND ALIGN (b) CAP <ul style="list-style-type: none"> • Category NAV • MESSAGE OWN AC (c) Keyboard <ul style="list-style-type: none"> • CLEAR, LAT, latitude, ENTER • LONG, longitude, ENTER • ALT, altitude, ENTER (d) CAP MESSAGE MAG HDG VAR (e) Keyboard HDG , mag var, ENTER (f) Align Progress Monitor
5. U/VHF Mode	T/R G

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

1.1.6 RIO - POST-START - CARRIER

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

16. Complete INS Align	<ul style="list-style-type: none"> • 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	<i>"Ready to Taxi"</i>

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

1.2.2 TAKEOFF - SHORE

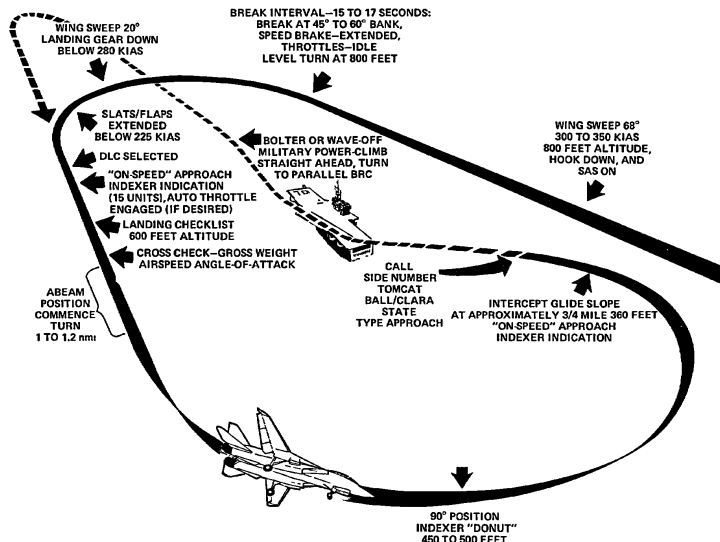
After Lining Up On Runway

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

1.2.3 TAKEOFF - CARRIER

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

1.2.4 LANDING - OVERHEAD PATTERN



1. Initial Approach	<ul style="list-style-type: none"> • WING SWEEP 68 deg • HOOK DOWN • SAS ON • HUD LDG • Airspeed 300-350 KIAS • Altitude 800 ft
2. Initial Break	<ul style="list-style-type: none"> • Break Interval 15-17 s • BANK 45-60 deg • SPEED BRAKE EXTEND • Throttle IDLE • G 3-4 G • Altitude 800 ft
3. Break Turn	<ul style="list-style-type: none"> • Wing Sweep AUTO < 280 KIAS • Landing Gear DOWN < 280 KIAS • FLAPS DOWN < 225 KIAS
4. Downwind	<ul style="list-style-type: none"> • DLC Selected once flaps out • AOA ON-SPEED • LANDING CHECKLIST • Altitude descend to 600 ft

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

1.2.5 LANDING - CHECKLIST

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

1.3 IN-FLIGHT

1.3.1 AERIAL REFUELING

1. REFUELING CHECKLIST	(a) WCS STBY (b) ARMING SAFE (c) DUMP Switch OFF (d) AIR SOURCE L ENG (e) REFUEL PROBE As desired (transition light off) (f) WING SWEEP As desired
2. DISENGAGE- MENT	(a) REFUEL PROBE RET (transition light off) (b) AIR SOURCE BOTH (c) WING SWEEP AUTO

1.3.2 AIRSTART

<ul style="list-style-type: none"> Spooldown 	<p><i>Before significant spooldown</i></p> <p>(a) Non-Running ENG IDLE or above</p> <p><i>If no relight occurs</i></p> <p>(b) Non-Running ENG OFF then IDLE</p> <p><i>If still no relight occurs</i></p> <p>(c) ENG MODE SEC</p> <p>(d) Non-Running ENG OFF then IDLE</p>
<ul style="list-style-type: none"> Cross-Bleed Restart 	<p><i>With one ENG running, if Spooldown fails</i></p> <p>(a) Non-Running ENG OFF</p> <p>(b) FUEL SHUT OFF check</p> <p>(c) Running throttle 80%+</p> <p>(d) BACK UP IGNITION ON</p> <p>(e) ENG CRANK non-running eng</p> <p>(f) Non-Running ENG IDLE</p> <p><i>If no start occurs</i></p> <p>(g) Non-Running ENG OFF then IDLE</p> <p><i>If still no start</i></p> <p>(h) ENG MODE SEC</p> <p>(i) Non-Running ENG OFF then IDLE</p>
<ul style="list-style-type: none"> Windmill Restart 	<p>(a) Airspeed >450 kts</p> <p>(b) Throttle IDLE or above</p> <p>(c) BACK UP IGNITION ON</p> <p><i>If no relight occurs</i></p> <p>(d) Throttle OFF then IDLE</p> <p><i>If still no relight</i></p> <p>(e) ENG MODE SEC</p> <p>(f) Throttle OFF then IDLE</p>
<ul style="list-style-type: none"> Post Restart 	<p>(a) BACK UP IGNITION OFF</p> <p>(b) ENG MODE PRI</p>

Chapter 2

SYSTEMS

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2.1 FLIGHT CONTROL SYSTEMS

2.1.1 AFCS - SAS

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

2.1.2 AFCS - AUTOPILOT

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

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

- | | |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • ACL | <ul style="list-style-type: none"> • Automatic Carrier Landing <ul style="list-style-type: none"> – See relevant section |
| <ul style="list-style-type: none"> • Autopilot Emergency Disengage Paddle | <ul style="list-style-type: none"> • Paddle on Stick <ul style="list-style-type: none"> – Disengages Autopilot Modes – Deactivates Pitch, Roll SAS Channels |

2.1.3 APC / AUTOTHROTTLE

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

2.1.4 ACLS

2.1.5 WING-SWEEP

- | | |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Overview | <ul style="list-style-type: none"> • In Flight Limited between 20 deg & 68 deg • On Ground can Oversweep to 75 deg • Hydromechanically Controlled <ul style="list-style-type: none"> – Automatically through CAD/C – Manually with emergency wing-sweep handle • 15 deg/s at 1g loading • Mechanically linked to ensure symmetry |
|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

<ul style="list-style-type: none"> CADC Modes 	<ul style="list-style-type: none"> AUTO <ul style="list-style-type: none"> CADC controls wing position as function of current Mach via wing-sweep program MAN <ul style="list-style-type: none"> Pilot manually chooses desired wing sweep angle with thumb controller BOMB <ul style="list-style-type: none"> Sets wing sweep to 55 deg or further aft
<ul style="list-style-type: none"> Emergency Mode 	<ul style="list-style-type: none"> Emergency Wing-Sweep Handle <ul style="list-style-type: none"> Moved with wing sweep program by spider detent under normal operation Can be forced out of spider detent and moved manually
<ul style="list-style-type: none"> Oversweep 	<ul style="list-style-type: none"> Selected via Emergency Wing-Sweep Handle <ul style="list-style-type: none"> (a) Em. Wing-Sweep 68 deg Wait for wing-seal airbags to deflate (b) HZ TAIL AUTH Illuminated (c) Em. Wing-Sweep 75 deg
<ul style="list-style-type: none"> Return to CAD/C Control 	<ul style="list-style-type: none"> After Emergency Mode / Oversweep <ul style="list-style-type: none"> (a) Em. Wing-Sweep Spider Detent (Fwd on startup) (b) MASTER RESET Press

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

NOTE

- Indicates **Max** forward selectable wing sweep position

2.2 NAVIGATION SYSTEMS

2.2.1 OVERVIEW

- **CAINS**

Carrier Aircraft Inertial Navigation System

- **Primary navigation system of F-14**
- Additionally provides information for tactical systems
 - Own position for long-range AIM-7 & AIM-54 modes
 - Accurate Datalink sharing/receiving

Main Components

- **IMU**

Inertial Measurement Unit

- 3-Axis, 4-Gimbal system prevents gimbal-lock
- 2 gyros provide aircraft attitude and stabilize the platform
- 3 accelerometers measure accelerations in all orthogonal axes

- **CSDC**

Computer Signal Data Converter

- Handles data interface between sensors and **WCS**

- **WCS**

AWG-9 Computer

- **WCS** performs general navigation computations and provides them to PILOT & RIO through displays

- **NPS**

Navigation Power Supply

- Provides power to **IMU** & **CSDC**

- **Subsystems**

- Radar Altimeter
- TACAN
- AHRS

Controls

- **CAP**

- Used for Data Entry
- **CATEGORY - NAV**

- **NAV MODE Selector**

- **OFF** – Turns off power to IMU
- **ALIGN** – Three align modes
See Alignment Section
- **INS** – Selects normal INS navigation mode
- **IMU/AM** – Selects backup mode. Uses IMU for aircraft attitude, TAS from CADC, and stored/entered winds for navigation
- **AHRS/AM** – Selects further degraded backup mode. Uses magnetic heading from AHRS, TAS and AoA from CADC, and stored wind and mag var for navigation

Failure Indicators

- **NAV COMP Light**

- If illuminates while **NAV MODE** is in **INS** indicates failure in **INS** or **CSDC**
- Navigation system automatically switches to **IMU/AM**
- Remains illuminated until **NAV MODE** is set to **IMU/AM**

- **IMU Light**

- Indicates failure of **IMU**
- Navigation system automatically switches to **AHRS/AM**
- Remains illuminated until **NAV MODE Switch** is set to **AHRS/AM**

- **AHRS Light**

- Indicates **AHRS** self-test detected a failure
- Magnetic heading now commanded by WCS computer using last known mag var values
- Heading values will degrade over time

2.2.2 ALIGNMENT - OVERVIEW

<ul style="list-style-type: none"> • Main Phases 	<p>(a) Coarse Alignment</p> <ul style="list-style-type: none"> • Warm-up of IMU elements • Gimbals caged to Airframe • Gyros brought up to speed • Coarse IMU platform leveling performed with accelerometer outputs • Begins upon completion of initialization sequence • Computes Initial coarse estimates of IMU wander angle <p>(b) Fine Alignment</p> <ul style="list-style-type: none"> • Uses gyroscopic drift to calculate true heading
<ul style="list-style-type: none"> • Primary Align Modes 	<ul style="list-style-type: none"> • SAT – NOT IMPLEMENTED • NON-SAT – Ground / Carrier
<ul style="list-style-type: none"> • Align Submodes 	<ul style="list-style-type: none"> • CAT ALIGN – overrides parking brake requirement • STORED HEADING – uses previous alignment as reference for rapid alignment • HANDSET – for CVA ALIGN when SINS data not available

NOTE

- Initialization requires Aircraft or Homebase data
 - Lat/Long
 - Pressure Altitude
- If **HANDSET Alignment** used requires Carrier parameters
 - Speed
 - True heading
- **Parking brake must be on during initialization of any mode**
 - If released during coarse align, **STBY** and **READY** lights flash, align program reinitializes
 - If released during fine align, suspend align discrete sent to CSDC, **STBY** or **READY** light blinks, time-to-align clock on **TID** stops

2.2.3 ALIGNMENT - NON-SAT

- | | |
|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Enter GND Align | <ul style="list-style-type: none"> • GND ALIGN requires own-aircraft or Homebase parameters <ul style="list-style-type: none"> - Latitude / Longitude - Altitude • Can be entered into CAP before or within 90-120 s after selecting GND ALIGN |
|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

NOTE

- Whatever has been hooked when **ALIGN** is selected is injected as own-aircraft coordinates
- If fine align complete not yet achieved, own-aircraft latitude entry will reinitialize the alignment

- | | |
|-----------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Enter CVA Align | <ul style="list-style-type: none"> • CVA ALIGN requires DL CAINS Mode to align aircraft IMU to ship's INS <ul style="list-style-type: none"> (a) Datalink ON (b) WCS STBY (c) D/L Mode CAINS/WAYPT (d) NAV MODE Switch CVA ALIGN |
| <ul style="list-style-type: none"> • Initialization | <ul style="list-style-type: none"> • After approx. 20 s STBY/READY Lights illuminate • TID displays alignment time of 0.7 during initialization • After 42-45 s NAV COMP and READY lights extinguish, indicating IMU is ready • Upon completion of initialization the Alignment Status Indicator (CARET) appears, |
| <ul style="list-style-type: none"> • Coarse Alignment | <ul style="list-style-type: none"> • CARET before coarse-align complete marker (first tick) • Upon completion of coarse alignment phase the CARET is directly above the first tick and changes to a DIAMOND |

NOTE

- Parking brake can be released for taxi after coarse align is complete. Will suspend align
- Suspend align indicated by flashing **STBY** and/or **READY Lights**
- During suspend align taxiing more than 4000 ft will render the **INS** performance unreliable

- **Fine Alignment**

- **DIAMOND** between first and third ticks
- **Second Tick** – minimum weapon launch criteria met
 - **STBY Light** – extinguishes
 - **READY Light** – light illuminates
 - **INS Mode** – may be selected
- **Third Tick** – fine alignment complete
 - Dot appears in Diamond
 - Can be left in align for progressively more accurate alignment

- **Exit Alignment**

- **Select INS Mode**
 - **READY Light** – extinguishes
 - Tactical tape appears
 - Normal navigation display available

- **Reinitialization**

If observable acronym (**O**) or stalled align noticed during fine align. RIO can apply any of following methods

Method 1

- (a) **NAV MODE SWITCH** **OFF**
- (b) **WCS** **OFF**
- (c) Proceed with normal start sequence

Method 2

- (a) **NAV MODE SWITCH** **OFF**
- (b) **NAV MODE SWITCH** .. **Desired Align Mode**

Method 3

- (a) **NAV MODE SWITCH** **INS**
Verify **IN** on **TID**
 - (b) **NAV MODE SWITCH** **OFF**
 - (c) **NAV MODE SWITCH** .. **Desired Align Mode**
-

NOTE

- You will get **Erroneous Heading Readings on a Carrier** even with fine align complete (up to 30 deg) due to ship's magnetic field
- Deviation goes away shortly after takeoff

2.2.4 ALIGNMENT - NON-SAT - SUBMODES

<ul style="list-style-type: none">• Stored Heading Alignment	<ul style="list-style-type: none">• Reference alignment stored prior to powering-down the aircraft• ASH – Automatic Stored Heading displayed on TID when align selected and reference align available
<ul style="list-style-type: none">• Handset Alignment	<ul style="list-style-type: none">• For use when SINS data not available (indicated by flashing HS on TID)• Similar to GND ALIGN but requires additional parameters for the ship movement<ul style="list-style-type: none">– Latitude / Longitude– Ship's Speed– Ship's True Heading
<ul style="list-style-type: none">• Catapult Alignment	<ul style="list-style-type: none">• Inhibits suspend align while positioned on the catapult when parking brake released

2.2.5 ALIGNMENT - FAILURES

- **TID Status Indicators**

Appear between first and second ticks

- **C – Cal Data Fail**
- **T – Temp** (cold IMU)
- **S – SINS Data Invalid**
- **O – Observable** (alignment data bad)

- **INS Status Indicators**

- **STBY ON / READY ON**

- Normal during align initialization
- Else indicates IMU, NAV COMP, NPS or AHRS Failure

- **STBY ON / READY OFF**

- Normal during align after initialization
- Normal when **IMU/AM** selected prior to completion of coarse align

- **STBY FLASHING / READY FLASHING**

- Alignment not initiated due to suspended alignment (check parking brake)

- **STBY FLASHING / READY OFF**

- Align suspended (check parking brake)

- **STBY OFF / READY ON**

- Min weapon launch requirements met

- **STBY OFF / READY OFF**

- System operating normally

- **STBY OFF / READY FLASHING**

(After 5 s both off)

- Occurs when **IMU/AM** selected and IMU is aligned. If another mode not selected within 5 s, alignment lost, INS not available

- **STBY OFF / READY FLASHING**

- Alignment suspended past mission alert criteria with parking brake off

2.2.6 WAYPOINT

- | | |
|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Reference Point Types | <ul style="list-style-type: none"> • 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 |
|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

2.2.7 TACAN

- | | |
|------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Overview | <p>Tactical Air Navigation System</p> <ul style="list-style-type: none"> • Indicates Position relative to station <ul style="list-style-type: none"> – Slant Range within 0.1 nm – Bearing within 0.5 deg • Operating Range – approx 300 nm • 126 channels, 2 modes of operation |
| <ul style="list-style-type: none"> • Operating Modes | <ul style="list-style-type: none"> • REC – Receive only • T/R – Transmit & Receive, enables ranging • A/A – Air to air mode |
| <ul style="list-style-type: none"> • Typical Operation | <p>TACAN Setup</p> <p>(a) Mode As Desired</p> <p>(b) Frequency As Desired</p> <p>(c) TACAN CMD As Required
(Corresponding Crewmember)</p> <p>Pilot Setup</p> <p>(a) STEER CMD TACAN</p> <p>(b) HSD MODE NAV</p> <p>(c) Desired Course Set via CRS Knob</p> <p>Consult BDHI and HSD to track TACAN station</p> |

2.2.8 VOR/ADF

- **Overview**

Automatic Direction Finder

- Used with **ARC-182 Radio**
- **BDHI** – Displays **Relative Bearing** to transmitting ground station
- **Range** – Line of sight
- **Frequency Range** – 108-399.975 MHz
- Only operable for RIO

- **Typical Operation**

RIO Setup

- (a) **V/UHF 2 Mode** **T/R**
(warm-up, at least 5 min)
- (b) **V/UHF 2 Frequency Mode** **MAN**
- (c) **V/UHF 2 Frequency** **As desired**
- (d) **V/UHF 2 Mode** **DF**

NOTE

- **UHF 1 ADF** is not functional despite controls in **PILOT** cockpit

2.2.9 DISPLAYS

Pilot Cockpit Interface

<ul style="list-style-type: none"> • HUD 	Heads Up Display <ul style="list-style-type: none"> • Displays flight & combat information onto front canopy
<ul style="list-style-type: none"> • VDI 	Vertical Display Indicator <ul style="list-style-type: none"> • TV Mode <ul style="list-style-type: none"> - Displays TCS imagery • NORM Mode <ul style="list-style-type: none"> - Displays similar flight & combat information as HUD
<ul style="list-style-type: none"> • HSD 	Horizontal Situation Display <ul style="list-style-type: none"> • NAV Mode Information <ul style="list-style-type: none"> - Diamond - Current heading - Chevron - TACAN TO bearing - + - TACAN FROM bearing - House - ADF bearing - RNG - Range to Waypoint (nm) - MODE - NAV STEER mode - W - Wind heading / speed (kts) - TAS - True AirSpeed (kts) - GS - GroundSpeed (kts) • TID Mode Information <ul style="list-style-type: none"> - Repeat of TID Symbology - Overhead View - Waypoint Coordinates
<ul style="list-style-type: none"> • BDHI 	Bearing Distance Heading Indicator <ul style="list-style-type: none"> • Displays A/C magnetic heading with nav bearing & range data • 2 Servo driven needles <ul style="list-style-type: none"> - No.1 (single bar) - UHF (ADF) system - No.2 (double bar) - TACAN System

2.3 COMMUNICATION SYSTEMS

2.3.1 OVERVIEW

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

2.3.2 ARC-159 UHF 1

<ul style="list-style-type: none"> • ARC-159 UHF 1 	<ul style="list-style-type: none"> • Air-to-Air & Air-to-Surface Communication • Pilot Controlled • Frequency <ul style="list-style-type: none"> - Range - 225.000 - 399.975 MHz - Steps - 25 kHz - Channels - 20
<ul style="list-style-type: none"> • VOL Knob 	<ul style="list-style-type: none"> • Controls Pilot UHF 1 Audio Level
<ul style="list-style-type: none"> • BRT/TEST Knob 	<ul style="list-style-type: none"> • Controls Radio FREQ Display • Turn past max to display 888.888
<ul style="list-style-type: none"> • SQL Switch 	<ul style="list-style-type: none"> • Toggles radio squelch (noise attenuation)
<ul style="list-style-type: none"> • READ Switch 	<ul style="list-style-type: none"> • Displays Frequency of Selected Preset Channel
<ul style="list-style-type: none"> • LOAD Button 	<ul style="list-style-type: none"> • Saves Displayed Frequency to Selected Preset Channel
<ul style="list-style-type: none"> • TONE Button 	<ul style="list-style-type: none"> • Steady 1.020 kHz Test Tone
<ul style="list-style-type: none"> • Mode Selector 	<ul style="list-style-type: none"> • Frequency Selection Method <ul style="list-style-type: none"> - GUARD - 243.000 MHz - MANUAL - Manual tuning - PRESET - Preset channels
<ul style="list-style-type: none"> • Function Selector 	<ul style="list-style-type: none"> • Selects Transceivers to Energize <ul style="list-style-type: none"> - ADF - Not simulated - BOTH - Main & Guard - MAIN - Main - OFF - Secures UHF 1 radio
<ul style="list-style-type: none"> • CHAN SEL 	<ul style="list-style-type: none"> • Selects from 20 preset Channels

2.3.3 ARC-182 V/UHF 2

- **ARC-182 V/UHF 2**

- **Air-to-Air & Air-to-Surface Communication**
- **RIO Controlled**
- **Frequency**
 - **Band 1** - 30 - 88 MHz
 - **Band 2** - 108 - 156 MHz
 - **Band 3** - 156 - 174 MHz
 - **Band 4** - 225 - 399.975 MHz
 - **Steps** - 25 kHz
 - **Channels** - 20

- **VOL Knob**

- **Controls RIO UHF 2 Audio Level**

- **BRT/TEST Knob**

- **Controls Radio FREQ Display**

- **SQL Switch**

- **Toggles radio squelch (noise attenuation)**

- **Mode Selector**

- **Transceiver Settings**
 - **OFF** - Secures V/UHF radio unless frequency mode set to **243**
 - **T/R** - Energizes transmitter and main receiver
 - **T/R & G** - Energizes transmitter, main, and guard receiver
 - **DF** - Automatic direction finding from 108 - 399.975 MHz
 - **TEST** - BIT

<ul style="list-style-type: none"> • CHAN SEL Outer Dial 	<ul style="list-style-type: none"> • Selects Frequency Tuning Mode <ul style="list-style-type: none"> - 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
<ul style="list-style-type: none"> • CHAN SEL Inner Dial 	<ul style="list-style-type: none"> • Selects one of 40 Preset Channels

2.3.4 KY-28 VOICE SECURITY EQUIPMENT

<ul style="list-style-type: none"> • KY-28 Voice Security Equipment 	<ul style="list-style-type: none"> • Voice Ciphering • Integrated with UHF 1 and V/UHF 2 • 2 min Warmup
<ul style="list-style-type: none"> • ZEROIZE Switch 	<ul style="list-style-type: none"> • Lift Guard to Erase Preloaded Codes • Codes loaded via ground crew
<ul style="list-style-type: none"> • Power-Mode Switch 	<ul style="list-style-type: none"> • Selects Mode <ul style="list-style-type: none"> - P/OFF – Removes power from system - C – Transmit / Receive in secure mode - DELAY – Between PTT and trans.
<ul style="list-style-type: none"> • Radio-Select Switch 	<ul style="list-style-type: none"> • Selects Radio Mode <ul style="list-style-type: none"> - RELAY – Acts as relay for other stations (not simulated) - RAD-2 – Secure voice for V/UHF 2 - RAD-1 – Secure voice for UHF 1

2.3.5 LINK 4 DATALINK - OVERVIEW

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

2.3.6 LINK 4 DATALINK - CONTROL PANEL

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

2.3.7 LINK 4 DATALINK - REPLY/ANTENNA PANEL

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

2.4 DEFENSIVE SYSTEMS

2.4.1 ALR-67 RWR - CONTROLS / OVERVIEW

• PWR Switch	• Set to ON to Operate
• VOL Knob	• Sets RIO Audio Level
• TEST Switch	<ul style="list-style-type: none">• Springloaded to Center• BIT – Initiates Build In Test• SPL – Holds BIT status page while held
• MODE Switch	<ul style="list-style-type: none">• Springloaded to Center• OFST – Separates overlapping symbols• LMT – Displays 6 highest threats
• DISPLAY TYPE Selector	<ul style="list-style-type: none">• Changes Priority of Display<ul style="list-style-type: none">– NORM – Normal threat symbology– AI – Airborne Interceptor prioritized– AAA – Anti-aircraft artillery prioritized– UNK – Unknown prioritized– FRIEND – Friendly threats prioritized• Indicated by Letter in Display Center

<ul style="list-style-type: none">• Display	<ul style="list-style-type: none">• Outer Band<ul style="list-style-type: none">- Critical Band- Imminent threat to own aircraft- Blinking indicates engaging own aircraft• Middle Band<ul style="list-style-type: none">- Lethal Band- Potentially threatening emitters- Not actively engaging own aircraft• Inner Band<ul style="list-style-type: none">- Non-Lethal Band- Not currently within capability of emitter• Inner Circle<ul style="list-style-type: none">- N, I, A, U, F – Prioritization type- O – Offset- L – Limit- B – BIT Failure- T – Thermal overload
<ul style="list-style-type: none">• Alert Tones	<ul style="list-style-type: none">• 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

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

AIRCRAFT

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

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

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

AIR DEFENSE

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

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

MISSILES

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

ATC

T	Airport ATC Radar
----------	-------------------

2.4.3 ALE-39 CMS DISPENSER**Programmer**

- | | |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• CHAFF Section | <ul style="list-style-type: none">• B QTY – Number of cartridges to eject in burst<ul style="list-style-type: none">– Options – 1-4 cartridges, C continuous, R random (4-6 cartridges)• B INTV – Time in seconds between each cartridge ejection<ul style="list-style-type: none">– Options – .1, .2, .5, .7, 1 seconds, R random• S QTY – How many salvos of bursts<ul style="list-style-type: none">– Options – 1, 2, 4, 6, 8, 10, 15 salvos• S INT – Time in seconds between salvos<ul style="list-style-type: none">– Options – 2, 4, 6, 8, 10 seconds |
|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

NOTE

- **R & C** burst settings have special **INTV** behavior

- | | |
|------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• JAMMER Sect. | Jammer cartridges not implemented in DCS |
| <ul style="list-style-type: none">• FLARE Section | <ul style="list-style-type: none">• QTY – Number of cartridges to eject in burst<ul style="list-style-type: none">– Options – 2, 3, 4, 6, 8, 10 cartridges• INTV – Time in seconds between each cartridge ejection<ul style="list-style-type: none">– Options – 2, 4, 6, 8, 10 seconds |

Control Panel

- | | |
|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• PWR/MODE Switch | <ul style="list-style-type: none">• 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

<ul style="list-style-type: none"> • DECM OVERVIEW 	<p>Defensive Electronic Counter Measures</p> <ul style="list-style-type: none"> • Modelled as simple noise jammers in DCS
<ul style="list-style-type: none"> • Controls 	<ul style="list-style-type: none"> • AUDIO Knob – Controls volume of audio played to RIO. Audio is generated directly from received PRF signals • Mode Selector <ul style="list-style-type: none"> – OFF – Turns off power to the system – STBY – Begins pre-warming system – HOLD 3 SEC – Prepares system for BIT – ACT – BIT of system, takes approx 30 s – REC – Receive only mode – RPT – Full system functionality
<ul style="list-style-type: none"> • STANDBY Light 	<p>Indicates system warmup not yet complete or system has a fault</p>
<ul style="list-style-type: none"> • Threat Advisory Indicator 	<ul style="list-style-type: none"> • IFF – Friendly IFF signal received but no reply generated • RCV – ALQ-126 is receiving a signal • XMIT – ALQ-126 is transmitting • SAM <ul style="list-style-type: none"> – Steady – Lockon from SAM detected – Flashing – SAM launch detected • AAA <ul style="list-style-type: none"> – Steady – Lockon from AAA detected – Flashing – AAA engagement detected • CW – CW emitter detected • AI – Airborne Interceptor lockon detected

Chapter 3

AWG-9 RADAR

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AWG-9

3.1 OVERVIEW

3.1.1 MAIN MODES - OVERVIEW

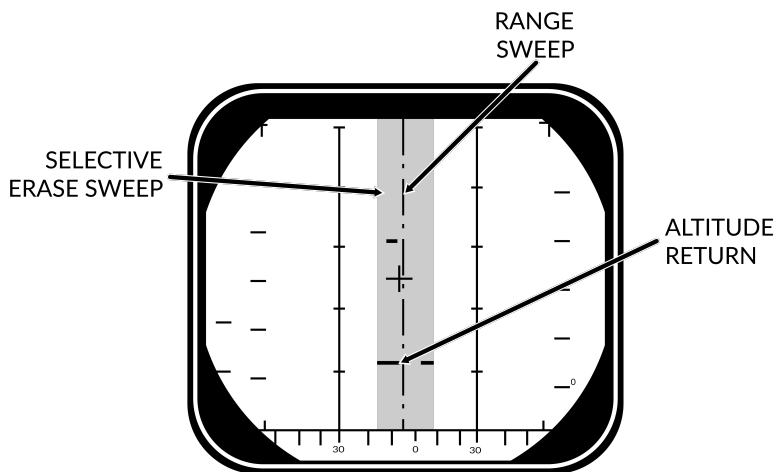
	Pulse		Pulse Doppler			
	Pulse Search	P-STT	PD Search	RWS	TWS	PD-STT
Range	60 nm	50 nm	110 nm	90 nm	90 nm	90 nm
AIM-7	BRSIT	CW	BRSIT		-	PD
AIM-54	BRSIT	ACT	BRSIT		Multi TGT	PD/ACT

3.1.2 MAIN MODES

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

3.2 PULSE MODES

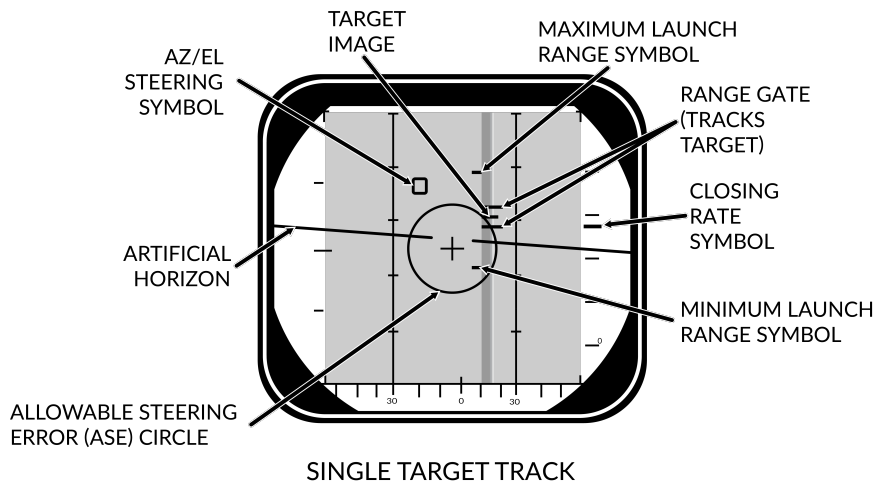
3.2.1 PULSE SEARCH



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

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

3.2.2 PSTT



- **Pulse STT**

Lock Target w/o doppler filtering

- **Advantages**

- Cannot be notched

- **Disadvantages**

- Susceptible to ground clutter

- **DDD**

- **Track Indications**

- ANT TRK & RDROT lights
- Tracking gates
- Closure rate
- Attack Symbology

NOTE

- **PSTT Lock Affects Missile Logic**

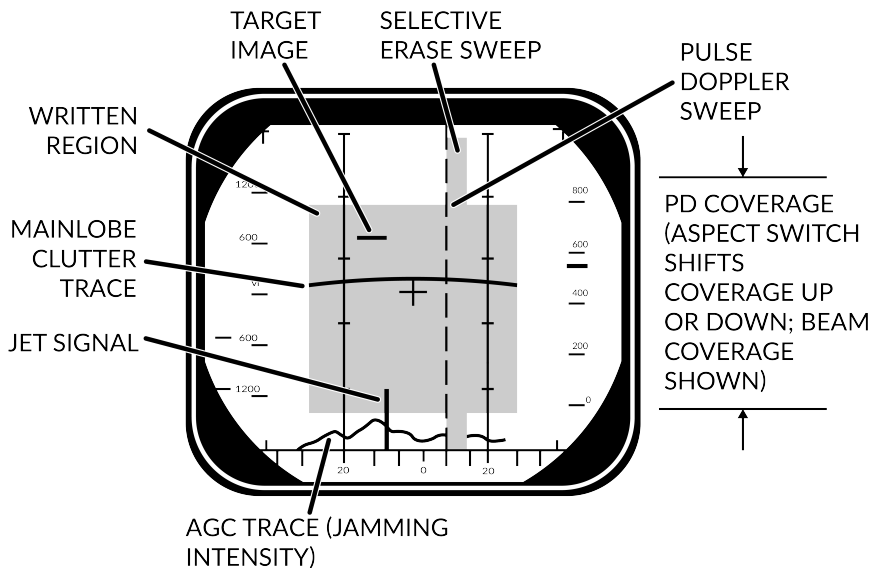
- AIM-54 launched in **Active Launch Mode**
- AIM-7 launched in **CW Mode**

3.2.3 PSTT ACQUISITION

<ul style="list-style-type: none">• Pulse To PSTT	<ul style="list-style-type: none">• Conditions<ul style="list-style-type: none">– Pulse Search Mode selected– RDR HCU Mode selected• Lock Target<ul style="list-style-type: none">(a) Hold HCU Half-action(b) Slew acquisition gates over desired Target on DDD(c) HCU Full-Action to lock• Unlock Target<ul style="list-style-type: none">(d) HCU Half-action
<ul style="list-style-type: none">• TWS to PSTT	<ul style="list-style-type: none">• Conditions<ul style="list-style-type: none">– TWS Mode selected– RDR HCU Mode selected• Lock Target<ul style="list-style-type: none">(a) Hook Target on TID(b) Press PSTT button on DDD Panel• Unlock Target<ul style="list-style-type: none">(c) HCU Half-action
<ul style="list-style-type: none">• ACM to PSTT	<ul style="list-style-type: none">• Lock Target<ul style="list-style-type: none">(a) Select desired ACM Mode (Pilot or RIO)(b) Place target in search volume through maneuvering• Unlock Target<ul style="list-style-type: none">(c) HCU Half-action
<ul style="list-style-type: none">• PDSTT to PSTT	<ul style="list-style-type: none">• Conditions<ul style="list-style-type: none">– Target PDSTT Locked• Lock Target<ul style="list-style-type: none">(a) Press PSTT button on DDD Panel• Unlock Target<ul style="list-style-type: none">(b) HCU Half-action

3.3 PULSE DOPPLER MODES

3.3.1 PULSE DOPPLER SEARCH



SEARCH ($\pm 40^\circ$ SCAN)

- Pulse Doppler Search**

“Early Warning” Mode - Longest Range, cannot display range

- Advantages**

- Longest Range
- Doppler Filtering
- **“Look Down Shoot Down”**

- Disadvantages**

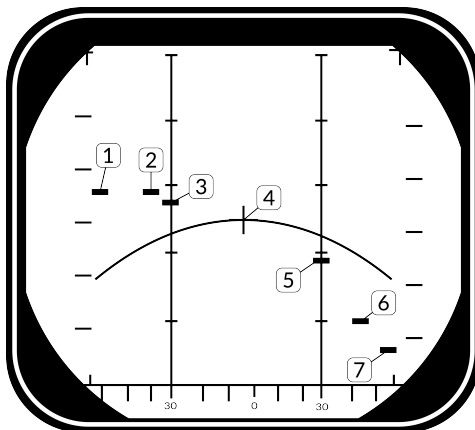
- Can be notched
- No range information

- DDD**

- Closure Rate/Azimuth**

- Visualization of radar and erase sweeps

<ul style="list-style-type: none">• Doppler Filters	<ul style="list-style-type: none">• MLC – Main Lobe Clutter Filter<ul style="list-style-type: none">– Own GS +/- 133 knots– Removes main ground return– Source of notching• ZD – Zero Doppler Filter<ul style="list-style-type: none">– Negative own GS +/- 100 knots– Removes Radar reflection from ground directly beneath own AC
<ul style="list-style-type: none">• MLC Switch	<ul style="list-style-type: none">• IN: Enables MLC filter• AUTO: Enables MLC filter if look-up angle less than 3 deg• OUT: Disables MLC filter
<ul style="list-style-type: none">• Vc Switch	<p>Changes closure rate DDD scale</p> <ul style="list-style-type: none">• X-4: -800 to 4000 knots• NORM: -200 to 1000 knots• VID: -50 to 250 knots
<ul style="list-style-type: none">• ASPECT Switch	<p>Changes closure rate processing scale</p> <ul style="list-style-type: none">• 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

NOTE

- Target **4** is *notching* and thus shows no radar return

3.3.2 RWS

<ul style="list-style-type: none"> • Range While Search 	<p>FM Ranging, used for getting good A/A picture before selecting TWS</p> <ul style="list-style-type: none"> • FM Ranging <ul style="list-style-type: none"> - Pulse Doppler with ranging - TID shows momentary tracks with ranges - Processing reduces max range • Advantages <ul style="list-style-type: none"> - Long Range - Doppler Filtering - “Look Down Shoot Down” - Signal Processing • Disadvantages <ul style="list-style-type: none"> - Can be notched
<ul style="list-style-type: none"> • DDD 	<ul style="list-style-type: none"> • Closure Rate/Azimuth • Visualization of radar and erase sweeps
<ul style="list-style-type: none"> • TID 	<ul style="list-style-type: none"> • Momentary Tracks • Max concurrent tracks: 48 • Cannot lock targets from TID
<ul style="list-style-type: none"> • Doppler Filters 	<ul style="list-style-type: none"> • MLC – Main Lobe Clutter Filter <ul style="list-style-type: none"> - Own GS +/- 133 knots - Removes main ground return - Source of notching • ZD – Zero Doppler Filter <ul style="list-style-type: none"> - Negative own GS +/- 100 knots - Removes Radar reflection from ground directly beneath own AC

3.3.3 TWS

<ul style="list-style-type: none"> • Track While Scan 	<p>Builds Track Files, high situational awareness, multi-target AIM-54 launch</p> <ul style="list-style-type: none"> • Track Files <ul style="list-style-type: none"> - AWG-9 builds Trackfiles for contacts - Can launch multiple AIM-54 - Processing reduces max range - Can lock targets from TID • FM Ranging <ul style="list-style-type: none"> - Pulse Doppler with ranging - TID shows momentary tracks with ranges - Processing reduces max range • Advantages <ul style="list-style-type: none"> - Doppler Filtering - Multi-Target AIM-54 • Disadvantages <ul style="list-style-type: none"> - Lowest Range - Can be notched
<ul style="list-style-type: none"> • DDD 	<ul style="list-style-type: none"> • Closure Rate/Azimuth • Visualization of radar and erase sweeps
<ul style="list-style-type: none"> • TID 	<ul style="list-style-type: none"> • Tracksfiles • Max concurrent tracks: 24 • Max displayed tracks: 18
<ul style="list-style-type: none"> • Doppler Filters 	<ul style="list-style-type: none"> • MLC – Main Lobe Clutter Filter <ul style="list-style-type: none"> - Own GS +/- 133 knots - Removes main ground return - Source of notching • ZD – Zero Doppler Filter <ul style="list-style-type: none"> - Negative own GS +/- 100 knots - Removes Radar reflection from ground directly beneath own AC
<ul style="list-style-type: none"> • Scan Volume 	<p>Trackfiles require update every 2.5 s -></p> <ul style="list-style-type: none"> • 20 deg 4 bar (if selected) • 40 deg 2 bar (else)

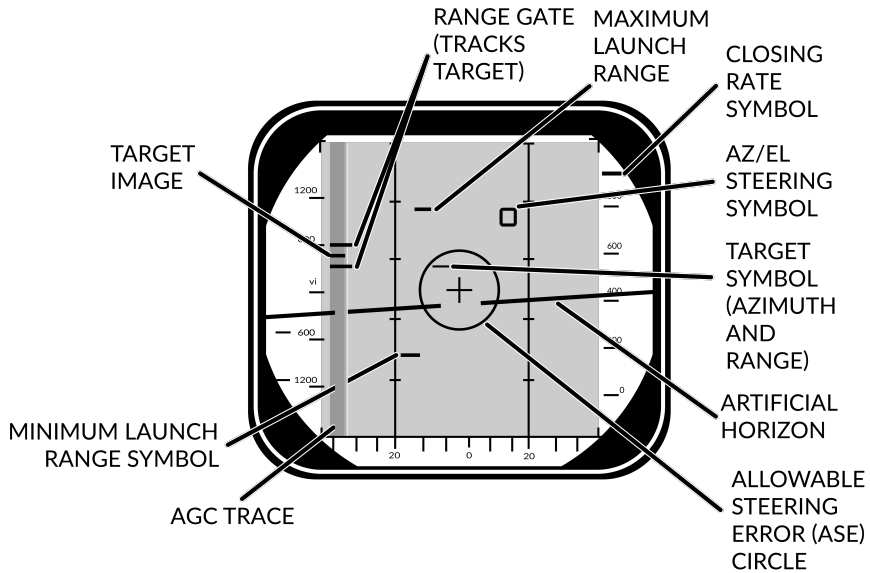
<ul style="list-style-type: none"> • TID Mode Selector 	<ul style="list-style-type: none"> • GND STAB: Ground Stabilized, True North is up on TID • A/C STAB: Aircraft Stabilized • ATTAK: same as A/C STAB with superimposed attack steering symbology • TV: Displays TCS on TID, displays LANTIRN on TID if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

3.3.4 TWS MAN

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

3.3.5 TWS AUTO

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

3.3.6 PDSTT

SINGLE TARGET TRACK

- Pulse Doppler STT**

- Advantages**

- Ground Clutter filtering

- Disadvantages**

- Susceptible to notching

- DDD**

- Track Indications**

- ANT TRK & RDROT lights
- Tracking gates
- Closure rate
- Attack Symbology

NOTE

- PDSTT Lock Affects Missile Logic**

- Enables launch of AIM-54/AIM-7 in **PD Mode**
- AIM-7 PD launch requires **MSL OPTIONS Switch** to be in **SP PD**

3.3.7 PDSTT ACQUISITION

<ul style="list-style-type: none">• PD To PDSTT	<ul style="list-style-type: none">• Conditions<ul style="list-style-type: none">– PD Search Mode selected– RDR HCU Mode selected• Lock Target<ul style="list-style-type: none">(a) Hold HCU Half-action(b) Slew acquisition gates over desired Target on DDD(c) HCU Full-Action to lock• Unlock Target<ul style="list-style-type: none">(d) HCU Half-action
<ul style="list-style-type: none">• TWS to PDSTT	<ul style="list-style-type: none">• Conditions<ul style="list-style-type: none">– TWS Mode selected– RDR HCU Mode selected• Lock Target<ul style="list-style-type: none">(a) Hook Target on TID(b) Press PDSTT button on DDD Panel• Unlock Target<ul style="list-style-type: none">(c) HCU Half-action
<ul style="list-style-type: none">• PSTT to PDSTT	<ul style="list-style-type: none">• Conditions<ul style="list-style-type: none">– Target PSTT Locked• Lock Target<ul style="list-style-type: none">(a) Press PDSTT button on DDD Panel• Unlock Target<ul style="list-style-type: none">(b) HCU Half-action

3.4 ACM MODES

3.4.1 OVERVIEW

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

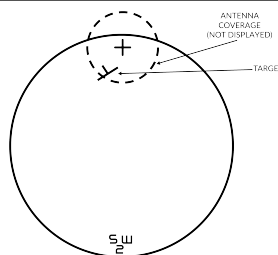
• PLM

• Pilot Lockon Mode

• Highest Priority ACM

• Search Pattern

- Small Boresight
- Range: 5 nm



• VSL

• Vertical Scan Lockon

• HI Search Pattern

- Width: 5 deg
- Vertical: +15 to +55 deg
- Range: 5 nm

• LO Search Pattern

- Width: 5 deg
- Vertical: -15 to +25 deg
- Range: 5 nm

• RIO/PILOT Controlled

• PAL

• Pilot Automatic Lockon

• Search Pattern

- Width: +/- 20 deg
- Vertical: 8-bar
- Range: 15 nm

• MRL

• Manual Rapid Lockon

• RIO Controlled

• Search Pattern

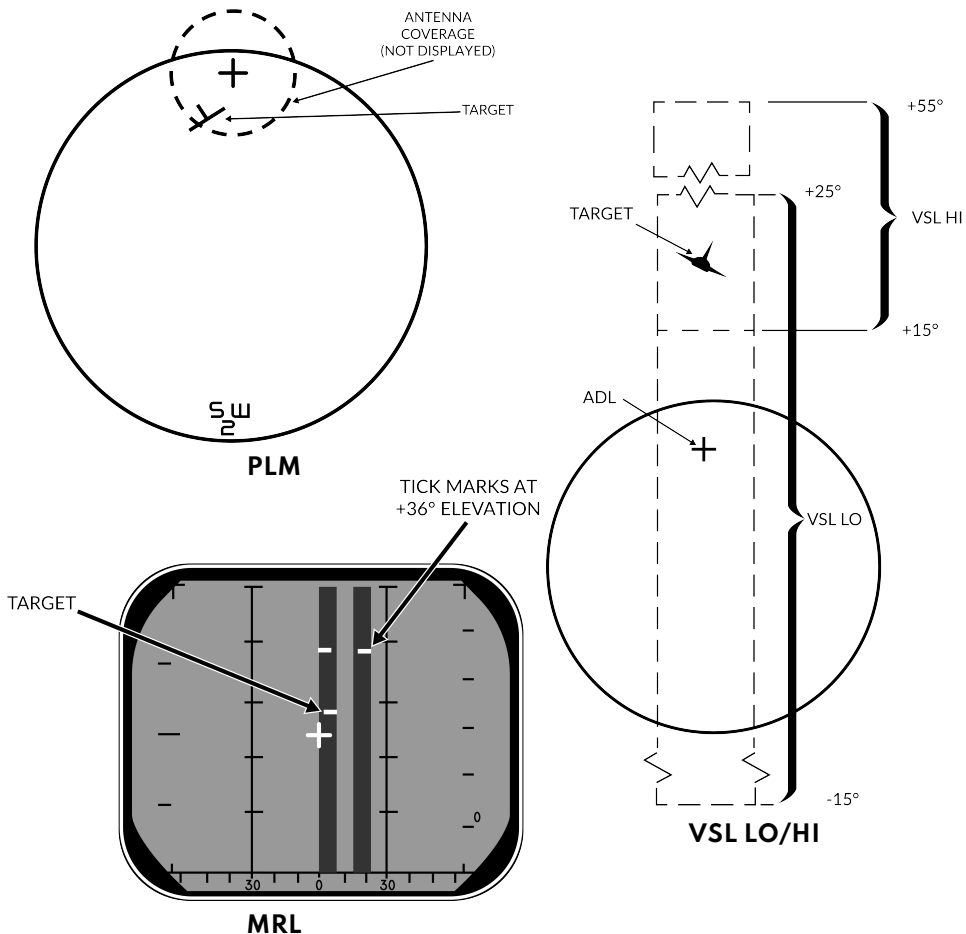
- HCU Controlled
- Range: 5 nm

NOTE

- **ACM Modes Result in PSTT Lock** – affects missile logic
 - AIM-54 launched in **Active Launch Mode**
 - AIM-7 launched in **CW Mode**

WARNING

- **Active Launch Mode Phoenixes Have Limited IFF Capability**
 - Employ with caution when friendlies airborne

3.4.2 VISUALIZATION

3.5 APX-76 IFF

3.5.1 OVERVIEW

3.5.2 INTERROGATION

• Activation	IFF Switch – Press & Hold (up to 10 sec)
• Search Modes	• DDD – 2 horizontal bars above & below all friendly returns
• TWS / STT Modes	• DDD – 2 horizontal bars above & below hooked / locked friendly • DDD Range – shows 10 EXP





NOTE

- **APX-76 Data is Not Correlated with TWS Tracks** – RIO must manually enter bogey status (HOST, UNKN, FRIEND) via the **CAP**
- **Lack of IFF Return does NOT necessarily mean Hostile**

3.6 TACTICAL INFORMATION DISPLAY




3.6.1 TID SYMBOLOGY















GENERAL

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





ONBOARD SENSORS

Symbol Above Dot





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







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

D/L REF POINTS

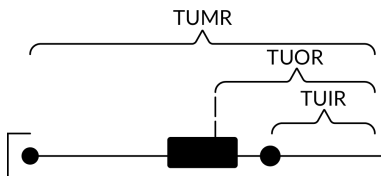
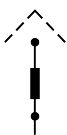
Home Base		<ul style="list-style-type: none"> • D/L Waypoint Representing Home Base
Waypoint		<ul style="list-style-type: none"> • D/L Generic Waypoint
Data Link Fixed Point		<ul style="list-style-type: none"> • D/L Waypoint Representing Fixed Point
Surface Target		<ul style="list-style-type: none">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

POS SYMB MODIFIERS

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

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

Launch Zone Vectors



- **Additional Symbolology 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 Symbolology 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 SYMBOLOGY

Artificial Horizon



- **Represents Pitch and Roll**

Steering Guidance
Symbol



- **Represents Steering Error**
 - Should be placed as near as possible to center of ASE circle

Allowable Steering
Error Circle



- **Indicates Allowable Steering Error for Missile Launch**
- **Size Varies with Geometry, Mode, Missile**

Breakaway Indica-
tion



- **Appears when Target Range Less than Minimum for Selected Weapon**

Chapter 4

TCS - LANTIRN

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4.1 TCS

4.1.1 OVERVIEW

4.2 LANTIRN

4.2.1 OVERVIEW

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

4.2.2 OVERVIEW - STARTUP

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

4.2.3 OVERVIEW - POINTING MODES

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

4.2.4 OVERVIEW - LASING/DESIGNATION

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

4.2.5 CONTROLS - PANEL

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

4.2.6 CONTROLS - STICK

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

4.2.7 DISPLAY

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

- **Mid Right**

- **Bomb 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

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

- JETT OPTIONS**

- **MERTER** – Jettisons ejector racks
- **WPNS** – Jettisons weapons only

- ATTK MODE**

- **CCMPTR TGT**
 - **Computer Target** – Similar to CCRP
- **CMPTTR IP**
 - **Computer initial point**
 - Extended **CMPTTR TGT** mode using known IP
 - For use when target hard to spot visually but close to landmark
- **CMPTTR 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 ORDNANCE JETTISON

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

5.2 UNGUIDED ORDNANCE

5.2.1 M61 GUN

1. Pilot Conditions	<ul style="list-style-type: none"> • MASTER ARM ON • HUD A/G • WEAPON SELECTOR GUNS • Wing Sweep BOMB
2. Employment	(a) Dive 20-30 deg (b) Pipper on target (c) TRIGGER FIRE
3. Note: TCS	<ul style="list-style-type: none"> • TCS slaved to radar impact point • Rio can select NAR or WIDE

5.2.2 FFAR / ZUNI ROCKETS

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

5.2.3 UNGUIDED BOMB - CCIP

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

5.2.4 UNGUIDED BOMB - CCRP

1. RIO Conditions	<ul style="list-style-type: none"> • WPN TYP MK-8X • Attack Mode Target Attack • Deliver Mode STP-PRS • Mechanical Fuze NOSE • Electronic Fuze INST • Delivery Options As Desired • Stations Armed
2. Pilot Conditions	<ul style="list-style-type: none"> • MASTER ARM ON • HUD A/G • WEAPON SELECTOR OFF • Stations verify selected • Wing Sweep BOMB
3. Designation	(a) Slew Diamond VSL HI/LO (b) Designate PAL

4. **Employment**

- (a) **Flight Path** Straight, Level
 - (b) **Vel Vector** on Bomb Fall Line
- When Solution Cue meets Velocity Vector
- (c) **STORE RELEASE** **Press and Hold**
-

5.3 GUIDED ORDNANCE

5.3.1 LASER GUIDED BOMB

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

- | | |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>5. Designate</p> | <p>Refer to LANTIRN Designation Section</p> <p>(a) Designate Trigger Full-Action</p> <ul style="list-style-type: none"> • Slant Range calculated • Time-to-Go calculated <p>Once Time-to-Release (TREL) is 0</p> <p>(b) Auto-Lase ... If selected: lases IOs to impact</p> <p>(c) Manual Lase Trigger Full-Action</p> <p>(d) While Lasing L blinks</p> |
| <p>6. Employment</p> | <p>Once Time-to-Release (TREL) is 0</p> <p>(a) STORE RELEASE Press and Hold</p> <p>(b) Flight Path Gentle right-hand turn
(to prevent masking)</p> |

5.3.2 TALD DECOYS

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

Chapter 6

A/A WEAPONS

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6.1 M61 GUN

6.1.1 M61 GUN - OVERVIEW

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

6.1.2 M61 GUN - MANUAL

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

6.1.3 M61 GUN - RTGS / NO RADAR

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

6.1.4 M61 GUN - RTGS / RADAR

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

6.2 AIM-9 SIDEWINDER

6.2.1 AIM-9 - OVERVIEW

<ul style="list-style-type: none">• Missile Preparation	<ul style="list-style-type: none">• MSL PREP<ul style="list-style-type: none">- AIM-9 seeker must be cooled- Either press SW COOL button- Or activation of ACM
<ul style="list-style-type: none">• Seeker Head Modes	<ul style="list-style-type: none">• SEAM<ul style="list-style-type: none">- 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<ul style="list-style-type: none">- AIM-9 locked to ADL- 2.5 deg FOV- Selected if MODE/STP set to BRSIT- And ACM not active
<ul style="list-style-type: none">• MODE/STP Switch	<ul style="list-style-type: none">• NORM<ul style="list-style-type: none">- Allows SEAM seeker mode• BRSIT<ul style="list-style-type: none">- Forces Boresight seeker mode- Overridden if ACM active
<ul style="list-style-type: none">• CAGE/SEAM Button	<ul style="list-style-type: none">• Uncages Seeker<ul style="list-style-type: none">- Starts 4.5 second double-D search- If no IR source found cages again• Slaves Seeker<ul style="list-style-type: none">- If radar STT locked

6.2.2 AIM-9 - SILENT

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

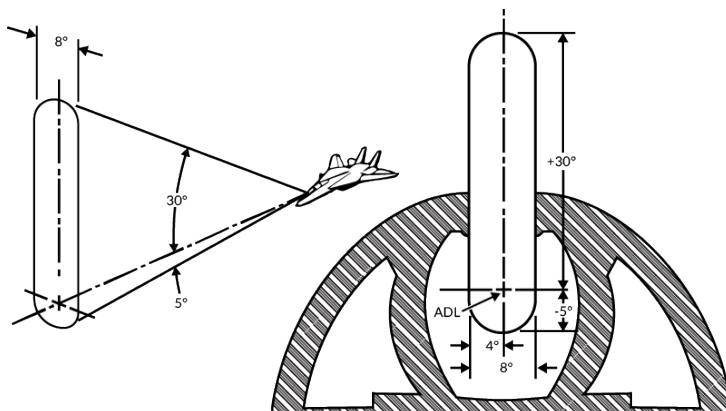
6.2.3 AIM-9 - RADAR

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

6.3 AIM-7 SPARROW

6.3.1 AIM-7 - OVERVIEW

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



6.3.2 AIM-7 - STT

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

6.3.3 AIM-7 - PDSTT -VS- PSTT

- **PSTT**

- **AIM-7 Guided in CW Mode**
- **PSTT Advantages / Disadvantages**
 - Susceptable to ground clutter
 - In close range scenarios (<20 NM) extremely hard to break lock

- **PDSTT**

- **AIM-7 CAN be Guided in SP PD Mode**
 - Requires **MSL OPTIONS** switch to be in **SP PD**
 - **Only Available on AIM-7F and Newer**
- **PDSTT Advantages / Disadvantages**
 - Susceptable to notching
 - Enables longest range Sparrow shots

NOTE

- **If launch is initiated on a PDSTT target with MSL OPTIONS switch set to NORM**
 - CW illumination & guidance will be used
 - Lock still based off PDSTT

6.4 AIM-54 PHOENIX

6.4.1 AIM-54 - OVERVIEW

<ul style="list-style-type: none"> • Missile Preparation 	<ul style="list-style-type: none"> • Weapon Cooling <ul style="list-style-type: none"> - AIM-54 requires liquid cooling - RIO enabled LIQUID COOLING switch • MSL PREP <ul style="list-style-type: none"> - AIM-54 must be tuned to AWG-9 - Either press MSL PREP button - Or activation of ACM
<ul style="list-style-type: none"> • Launch Modes 	<ul style="list-style-type: none"> • PDSTT SARH <ul style="list-style-type: none"> - 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 <ul style="list-style-type: none"> - Allows 6 launches at 6 targets - Missile initially SARH guided - When within AIM-54 seeker range AWG-9 sends activation command - Not Fire and Forget: Requires automatic activation command • ACM Active <ul style="list-style-type: none"> - Activated when BRSIT selected - Or ACM active with no radar track - Missile commanded active before launch
<ul style="list-style-type: none"> • MSL SPD GATE Switch 	<ul style="list-style-type: none"> • NOSE QTR – Standard setting in DCS • All Others – Not simulated
<ul style="list-style-type: none"> • MSL OPTIONS Switch 	<ul style="list-style-type: none"> • NORM <ul style="list-style-type: none"> - Normal guidance (SARH or SARH/ARH) • PH ACT <ul style="list-style-type: none"> - WCS immediately sends AIM-54 activation command on launch - Reverts to SARH if no target detected - Must be selected before launch

<ul style="list-style-type: none">• TGTS Switch	<ul style="list-style-type: none">• SMALL – 6nm activation range• NORM – 10nm activation range• LARGE – 13nm activation range
<ul style="list-style-type: none">• Missile Next Launch Button	<ul style="list-style-type: none">• Selects Hooked Track as Next Target for AIM-54 TWS Engagement
<ul style="list-style-type: none">• MODE/STP Switch	<ul style="list-style-type: none">• NORM – Normal operation• BRSIT<ul style="list-style-type: none">– Commanded active before launch– Missile follows ADL and locks strongest return
<ul style="list-style-type: none">• TWS Symbology	<p>Refer to TID Symbology Section</p> <ul style="list-style-type: none">• Pre-Launch<ul style="list-style-type: none">– Prioritization numbers assigned to tracks automatically or manually– Blinking indicates optimal launch parameters• Post-Launch<ul style="list-style-type: none">– Target prioritization number replaced with TTI– Other prioritization numbers collapsed by one– Tracks under missile attack brightened– TTI blinks when missile active
<ul style="list-style-type: none">• Launch To Eject (LTE) Time	<ul style="list-style-type: none">• Normal Operation – 3-4 seconds• When in ACM – 1 second

6.4.2 AIM-54 - PD-STT

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

NOTE

- Missile SARH until impact – must maintain radar lock

WARNING

- ACM Radar Modes Result in PSTT Lock
 - Missile is active off the rail
 - Employ with caution when friendlies airborne

6.4.3 AIM-54 - TWS / MULTI

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

NOTE

- **AWG-9 Responsible for Sending Activation Command**
 - Must maintain track until this point
 - AWG-9 continues to send guidance information after missile activation

WARNING

- **AIM-54 has NO IFF Capability**
 - Employ with caution when friendlies airborne

6.4.4 AIM-54 - ACM

1. Pilot Conditions	<ul style="list-style-type: none"> • MASTER ARM ON • HUD A/A • MSL PREP ON • ACM COVER UP • WEAPON SELECTOR PH
2. RIO Conditions	<ul style="list-style-type: none"> • LIQUID COOLING ON (FWD) • MSL SPD GATE NOSE QTR • MSL OPTIONS As Desired • TGTS Switch As Desired
3. Employment	<p>(a) Steering</p> <ul style="list-style-type: none"> • Range < 10 nm for immediate tracking • Azimuth near ADL <p>(b) Trigger Press and Hold (until weapon release)</p> <p>(c) Repeat Can fire additional missiles (no guarantee good missile distribution to targets)</p>

WARNING

- **MISSILE IS PITBULL OFF THE RAIL** – No IFF capabilities

