BMS F-16

Checklists - Weapon Volume

<div>
Not suited for Real Operations
Made for FALCON BMS 4.35
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CONTENTS

FOREWORD
This volume is intended as an inflight quick reference aid relevant to weapons in BMS only.

GPB - SMS CNTL page

Arming DELAYS are set in the CTNL page (Access via the A-G SMS page).
Use C2 for CBUs (burst altitude setting) and C1 for all the other weapons
(dumb bombs and GBUs)

To set an ARMING DELAY:
1. From the SMS page, select the OSB labelled CNTL
2. The highlighted mode is the active mode
3. The highlighted AD is dependant on the NOSE/TAIL/NSTL
    setting in the SMS page
4. Depress the OSB next to the mode to change (C1 or C2)
5. Use the labelled OSB to enter a new AD value
6. Hit the OSB labelled ENT to confirm entry
7. Hit the OSB labelled RTN to return to the CNTL page
8. Repeat process for AD2 if you are in C1 mode
9. If you are in C2 mode, use labelled OSB to enter a new BA value
10. Confirm by hitting the OSB labelled ENT to confirm
11. Depress the OSB labelled CNTL to get back to SMS page

Note:
Correct fusing time can be checked at release with the fuse arming cue
being lower than the FPM and the LOW warning not displayed on the HUD.
If LOW is displayed, the weapon will not have time to arm (duds)

To set a RELease ANGle:
The Release Angle is used for DTOS delivery. The set angle is the climb up
angle the aircraft has to fly during bomb release to successfully hit the target.
1. From the SMS page, select the OSB labelled CNTL.
2. Depress OSB 10 to access the REL ANG page
3. Use the labelled OSB to enter a new angle value
4. Hit the OSB labelled ENT to confirm entry.
5. Hit the OSB labelled RTN to return to the CNTL page
6. Depress the OSB labelled CNTL to get back to SMS page.
7. Fly at that angle during bomb release to ensure that the
    bomb hit the target

NOSE / TAIL / NSTL Selection:
1. By Selecting NOSE the value in AD1 will be active (C1)
2. By selecting TAIL the value in AD2 will be active (C1)
3. By Selecting NSTL – Both Detonators are selected.

Select NSTL when using C2 in CNTL page
Use NOSE or TAIL with C1 in CNTL page according to the inserted values in
AD1 and AD2.

GPB - SMS SETUP

PROFILE 1

1. Arming Delay: Set and check
2. Burst Altitude: Set and check if required
3. Release Angle: Set and check if required
4. Weapon release: Set SINGLE or PAIR
5. Weapon Spacing: Set and check
6. Weapon Ripple: Set and check

PROFILE 2

Repeat 1-6 to set Profile 2.
Toggle PROF1 – PROF2 with OSB#7

Note:
Ensure DRIFT C/O is placed in NORM so wind effects are computed

GPB – CCRP LEVEL

1. Master Mode: A-G
2. Master ARM: Set ARM or SIM
3. Right MFD (SMS): Select CCRP (OSB #1)
   Select desired weapon
4. Left MFD: Select desired sensor (FCR/TGP)
5. Target: Designate
6. HUD: Verify CCRP symbology & align FPM on
   The azimuth steering line
7. First release cue Monitor
8. Weapon Release Depress and hold for computed release
   On second release cue

GPB – CCRP LOFT

1. Master Mode: A-G
2. Master ARM: Set ARM or SIM
3. Right MFD (SMS): Select CCRP (OSB #1)
   Select desired weapon
4. Left MFD: Select desired sensor (FCR/TGP)
5. Target: Designate
6. HUD: Verify CCRP symbology & align FPM on
   The azimuth steering line
7. First release cue Pull 4g to release angle
8. Weapon Release Depress and hold for computed release
   On second release cue

GPB - CCIP

1.	Master Mode:	A-G
2.	Master ARM:	Set ARM or SIM
3.	Right MFD (SMS):	Select CCIP (OSB #1)
		Select desired weapon
4.	HUD:	Verify CCIP symbology & place CCIP pipper on the target
5.	Weapon Release	Depress

Note:
For ripple release the CCIP symbol is placed in the middle of the total bombs spacing.

GPB - DTOS

1.	Master Mode:	A-G
2.	Master ARM:	Set ARM or SIM
3.	Right MFD (SMS):	Select DTOS (OSB #1)
		Select desired weapon
4.	DMS:	SOI to HUD
5.	HUD:	Verify DTOS and slew TD box over target (or manoeuvre aircraft to place TD box over target)
6.	TMS:	Designate target
7.	HUD:	Maintain FPM on bomb fall/steering line
8.	Weapon Release	Depress and hold

Note:
TMS down reinitialize DTOS to pre designate mode (TD box on FPM)

GPB - LADD

1.	Master Mode:	A-G
2.	Master ARM:	Set ARM or SIM
3.	Right MFD (SMS):	Select LADD (OSB #1)
		Select desired weapon
5.	HUD:	Verify LADD symbology
6.	UFC:	Select target steerpoint
7.	HUD:	Fly LADD manoeuvre
8.	Weapon Release	Depress and hold for computed release.

AGM-65 MAVERICK

AGM-65A/B: Colour: White
                Rail: LAU-88 triple ejector or LAU-117 single rail
                Range: 10 Nm
                Type of target: vehicles & soft targets
                Targeting: WPN MFD page
AGM-65D: Colour: Green
                Rail: LAU-88 triple ejector or LAU-117 single rail
                Range: 15 Nm
                Type of target: vehicles & soft targets
                Targeting: Radar handoff, TGP handoff, Vis
AGM-65G: Colour: Grey
                Rail: LAU-117 single rail
                Range: 20 Nm
                Type of target: large structure
                Targeting: Radar handoff, TGP handoff, Vis

Note:

Mavericks need a 3 minutes' gyro spin up time before use.
Max power on time is 60 min with video off and 30 min with video on
Maverick can be set to auto power automatically at cardinal direction from specific steerpoints. See Maverick CNTL page.

AGM-65D/G BORESIGHT

1. Boresight is a procedure that ensure aircraft sensors (Radar & TGP) are looking at the same spot as the missile sensor (WPN). Mounting missiles on their rail induce alignment errors. Boresight delete that alignment error. It must be complete for each missile station (i.e. rail, not all missile on the same rail).
2. Boresight procedure is possible on the ground when GND JETT switch is placed in ENABLE position (and master arm set to SIM)
   please note: Ground boresight is almost impossible to achieve in BMS.
3. Missiles are always HOT. A pickle will fire the missile. Ensure you set master arm to SIM for boresight procedures.
4. Maverick video is inhibited if Master arm is safe, maverick is not powered, with WOW unless GND JETT is Enable) and if stations are not uncaged (AGM-65A/B/D)
5. Only AGM-65 D/G can be used with the TGP or FCR. AGM-65A/B must be fire from the WPN page.

AGM-65D/G BORESIGHT (Continued)

Master Mode:	A-G
SMS:	Power on mavericks (3 minutes required)
Master Arm:	SIM
MFD pages:	Set TGP left WPN right
TGP MFD:	Go NARO FOV and designate target with TMS up to obtain POINT TRACK
WPN MFD:	Check HANDOFF IN PROGRESS STA x
SOI:	Move SOI to WPN page (DMS down)
Cursors:	Slew WPN page cursor on the same TGP target and designate (TMS up)
Boresight:	Hit OSB#20 BSGT on WPN page
MSL STEP:	Step to the next station (rail)
UNCAGE:	if necessary (video = off requires UNCAGE)
Cursors:	Slew WPN page cursor on the same TGP target and designate (TMS up)
Boresight:	Hit OSB#20 BSGT on WPN page
CANCEL ALL TRACKS	Go MSL Override mode (fastest way to cancel all tracks is to change master mode)
Master Mode:	Switch back to A-G mode.
TGP page:	Obtain POINT track on a target in NARO FOV
WPN page:	Check same LOS and successful handoff
	Confirm "C" displayed on top of the handed off station.
SMS:	Power off missile as required
SPI:	Cancel all slew: TMS down / Wide FOV /Cursor Zero

Note:
Handoff is the action of an aircraft sensor (TGP, FCR) to send target position to the missile (WPN)
Boresight is an alignment procedure to ensure that all sensors are aligned and looking at the same spot.

MAVERICK RIPPLE LAUNCH (after TGP/FCR Boresight)

Master Mode:	A-G
SMS:	Check Maverick Powered and ready
Master Arm:	ARM
MFD pages:	Set TGP left WPN right
MSL:	Uncage if required
TGP MFD:	Go NARO FOV and designate target with TMS up to obtain POINT TRACK
WPN MFD:	Check HANDOFF IN PROGRESS STA x
	Check "C" for complete handoff
	Check MSL LOS and pointing cross in keyhole
	Check missile in range
	Check Weapon cross steady

Note:
No slew or designate is required on WPN page, only checks

MSL STEP:	to select next missile
MSL:	Uncage if necessary
TGP MFD:	Go NARO FOV and designate 2nd target with TMS up to obtain POINT TRACK
WPN MFD:	Check HANDOFF IN PROGRESS STA x
	Check "C" for complete handoff
	Check MSL LOS and pointing cross in keyhole
	Check missile in range
	Check Weapon cross steady
Pickle:	Depress twice (unless Ripple is set to 2)
SPI:	Reset (TMS down / wide FOV / CZ)

MAVERICK VIS LAUNCH

Master Mode:	A-G
SMS:	Check Maverick Powered and ready
Master Arm:	ARM
WPN page:	Select VIS and check HUD SOI
Target:	Place TD box over the target with the cursors and ground stabilize with TMS UP
WPN page:	Go EXP FOV, refine cursors if required and designate target with TMS UP
	Check range and steady pointing cross
Pickle:	Depress

Note:
You may step and set the second missile and ripple fire as well.
Relevant missile LOS will be visible in the HUD

LASER GUIDED BOMBS (LEVEL)

Master Mode:	A-G
Master Arm:	ARM
LASER Arm:	ARM
TGP:	Check ready and SOI
SMS:	Select GBU and set CNTL as required
DED – LASER page:	Set Laser code to match weapon code
	Set AG laser to combat
	Set LASER ST TIME to 12s (PII) or 20s (PIII)
HUD:	Check Steady "L" (if "T" is displayed the laser is in training mode)
Target:	Capture with TGP. AREA or POINT
Ranging:	Manual Lase target (trigger) to get accurate range (L precedes Range to target) that also check laser manual firing.
CCRP:	Align FPM with bomb fall line and wait for CCRP release cues (1st is loft, second is level)
Pickle:	Depress & hold before second release cue hits FPM
Bombs away:	Execute gentle left turn.
TTI:	Monitor Time to Impact and check flashing "L" at TTI -12 seconds (or -20s for PIII).
Bomb impact:	Reset SPI (TMS down / Wide FOV / CZ)
LASER Arm:	As required
Master Arm:	As required

LASER GUIDED BOMBS (LOFT)

Lofting GBU is the same as the level delivery till the 1st CCRP cue. Target capture may be harder at low level. Plan for a pop at required altitude for target capture and descend NOE inbound the target.

5Nm from target:	PULL UP 4G in 2 seconds to 40/45°
Pickle:	Depress and hold till second cue hits FPM
Bomb release:	Slice back left to low altitude
TTI – 20 seconds	Check flashing "L"
Bomb impact:	Reset SPI (TMS down / Wide FOV / CZ)
LASER Arm:	As required
Master Arm:	As required

Note:
Manual lasing is always advisable over auto lasing. When in doubt manual lase the target as soon as possible to increase hit PK.

LGB: BUDDY LASING

Eyeball:

Master Mode:	A-G
Master Arm:	ARM
LASER Arm:	ARM
TGP:	Check ready and SOI
DED – LASER page:	Set Laser code to match wingman code
	Set AG laser to combat
HUD:	Check Steady "L" (if "T" is displayed the laser is in training mode)
Target:	Capture with TGP. AREA or POINT
Ranging:	Manual Lase target (trigger) to get accurate range (L precedes Range to target) that also check laser manual firing.
Radio:	Announce Target captured, code set
Target:	Arc the target standing by for lasing
Wingman call 15" bfr impact:	Manual lase target and announce lasing
TGP/HUD:	Check Flashing "L".
Bomb impact:	Reset SPI (TMS down / Wide FOV / CZ)
LASER Arm:	As required
Master Arm:	As required

Deadeye:

Master Mode:	A-G
SMS:	Select GBU and set CNTL as required
Master Arm:	ARM
LASER Arm:	OFF
Target:	Designate
Lead capture call	Ingress target on CCRP cue
10 seconds before release:	Call 10 seconds
2nd CCRP cue	Pickle and hold, call bombs away
TTI:	Monitor and call 15 seconds (before impact)
Bomb impact:	Reset SPI (TMS down / Wide FOV / CZ)
Master Arm:	As required

Note:

By setting the LST code to the Eyeball laser code (DED laser page) the deadeye will be able to spot the laser on the target on TGP (LST must be enabled on TGP with OSB #20)

AGM-88 POS EOM (Position known)

Master Mode:	A-G
Master Arm:	ARM
SMS:	Select AGM-88 and PWR ON
MFD pages:	Set FCR A-A left & WPN right
WPN page:	Make SOI and select POS/EOM
Threat Tables:	Select relevant threat table
Threat handoff:	Handoff briefed SAM type: press SAM OSB
STPT DED page:	Set briefed PPT STPT (Sam location)
WPN page:	Check under LSDL for correct threat type and correct steerpoint, TOF & TOI
HUD:	Check Missile In range
Pickle:	Depress and Hold till missile fire.
WPN page:	Check Post Launch information (above LSDL)
Next Missile:	Repeat threat type and STPT selection

Threat tables (OSB #2):
Table 1: SA-2 / SA-3 / SA-4 / SA-5 / SA-6
Table 2: SA-8 / SA-9 / SA-10 / SA-11 / SA-12
Table 3: SA-13 / SA-15 / SA-17 / N / C
Table 4: H / P / A / U / S
Table 5: B / F / X / L / O
Table 6: D -
Note: Step missile will remember Handoff threat but STPT is always the active one. Always set STPT prior to missile pickle.

AGM-88 HAS (Harm As Sensor)

Master Mode:	A-G
Master Arm:	ARM
SMS:	Select AGM-88 and PWR ON
MFD pages:	Set FCR A-A left & WPN right
WPN page:	Make SOI and select HAS
Threat Tables:	Select relevant threat table
FOV:	As required (WIDE/CENTER/LT/RT)
Threat handoff	Move cursors to threat and designate with TMS UP
Check handoff complete when RDY is displayed above OSB#13	
Pickle:	Depress and Hold till missile fire.

Note:
HAS is unable to provide range to threat. Range must be deducted from PPTs threat circles.

AGM-88 HAD

> Note:
> HAD requires HTS pods. Only a few blocks are able to carry HTS on the chin pylon.

Master Mode:	A-G
Master Arm:	ARM
SMS:	Select AGM-88 and PWR ON
LEFT HDPT PWR:	Check ON
MFD pages:	Set FCR A-A left & HAD right (SOI)
FOV:	As required (OSB#3)
Threat handoff:	Move cursor to threat and designate with TMS UP
HARM footprint:	Check designated threat within HARM footprint. Or check HUD in range cues
Confidence level (PGM)	Beam threat till PGM2 is achieved minimum. Ideally delay till PGM1 status
Pickle:	Depress and Hold till missile fire.

HAD Symbols:
Green: Radar not emitting or outside HTS footprint
Yellow: Radar emitting
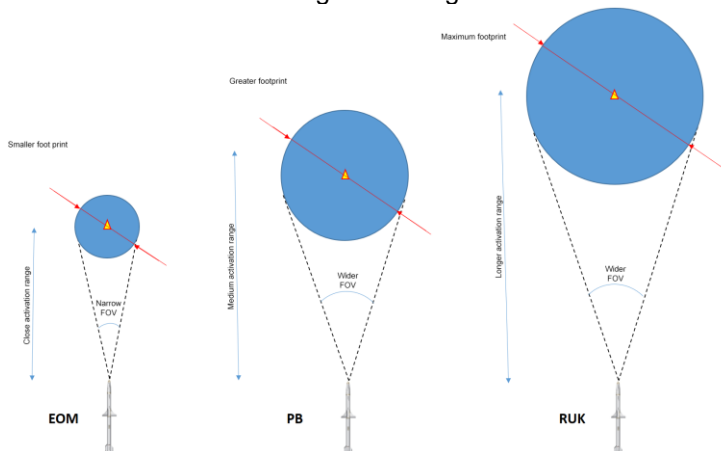Empty box: Threat selected, handoff in process
Box filled with pale red: handoff complete

AGM-88 activation depending on submode:
EOM: Close range from target – Narrow FOV
PB: Medium from target – Wide FOV
RUK: Maximum range from target – Wide FOV

IAM (JSOW) PRE MODE

Master Mode:	A-G
Master Arm:	ARM
DED:	Select target Steerpoint
SMS page:	Select IAM and check PWR ON
	Select PRE mode
	Select station to fire
	Set Impact option if required (SGL, SIDE, TRAIL)
	Set impact spacing if required
SMS CNTL page:	Set attack azimuth (JSOW, WCMD)
	Set EGEA (End Game Entry **Altitude)** in feet
	Set ROB (**Range** on Bearing) in Nm

Note:

Attack heading defines a heading the JSOW should fly to attack the target
End game altitude defines the altitude the JSOW will fly during attack, ROB
defines the distance at which the weapon must be aligned with the target.

SMS page:	Check weapon status (RDY)
Cursor slew:	Cancel with Cursor Zero unless required

Note:

IAMs will attack the cursor position. Ensure all cursor slew have been
cancelled before firing unless cursors reflects target position.

Airspeed/attitude:	Between M0.6 and M0.95 / Max 60° pitch and bank
	Altitude less than 40.000feet/ Target bearing < 60°
HUD:	Check caret within DLZ and JIZ displayed
Pickle:	Hold until weapon release (1.6 sec/ weapon)

Note:

All IAMs need around 1.6 seconds release consent. Failure to keep the
pickle depressed long enough will induce Hung weapons. For ripple release
ensure you keep the pickle depressed over 3 seconds

IAM (JDAM) PRE MODE

Master Mode:	A-G
Master Arm:	ARM
DED:	Select/input target Steerpoint coordinates
SMS page:	Select JDAM
	Set PWR ON & monitor alignment
SMS CNTL page:	Set Profile 1
	Set PRE mode
	Arming Delay as required
	Impact Azimuth as required (0 = direct)
	Impact Angle & Velocity are N.I. (leave default)
	Set Profile 2, 3 and 4 as required.
SMS page:	Check weapon status (RDY)
	Check correct Profile selected
Steerpoint:	Ensure Target Steerpoint selected.
Cursor slew:	Cancel with Cursor Zero unless required.
Airspeed/attitude:	Between M0.5 and M1.5 / Max 60° pitch and bank
	Target bearing within 60°
HUD:	Check Range caret inside RMAX1 (LAR1) for direct attack
	Check Range caret inside RMAX2 (LAR2) for Impact azimuth.
Pickle:	Hold until weapon release (1.6 sec/ weapon)

Note:

Rippling JDAMs is not possible with a single pickle press. To attack multiple targets with JDAMS you should select the first attack steerpoint, release JDAM, select the next attack steerpoint, change SMS profile if required and drop the next JDAM.

All IAMs need around 1.6 seconds release consent. Failure to keep the pickle depressed long enough will induce Hung weapons.

Impact Angle and Impact Velocity for JDAMs are not implemented in BMS. Settings can be left at default.

IAM VIS MODE

Note:
VIS mode enables to quickly attack a visual target within the HUD field of view. It has 2 stages: pre-designate and post-designate. TMS up designate target and send target coordinates to the selected IAM weapon.

Master Mode:	A-G
Master Arm:	ARM
SMS page:	Select IAM
	Set PWR ON & monitor alignment
	Set VIS mode
SMS CNTL page:	Set CNTL page according to IAM type and required release settings.
HUD:	Verify TD box is displayed coincident with FPM.
	Slew or Fly TD box over the target
Designate Target:	TMS UP to ground stabilize TD box
	Refine TD box position with cursors if required
SMS page:	Check weapon status (RDY)
	Check correct Profile selected
Attitude:	Follow steering cues to manoeuvre into release parameters.
	Remain within selected IAM launch envelope.
HUD:	Check valid range
	(JIZ for JSOW & RMAX1/2 for JDAMs)
Pickle:	Hold until weapon release (1.6 sec/ weapon)

SPICE (SMART PRECISE IMPACT COST EFFECTIVE)

Note:
SPICE is a GPS Glide bomb.
Glide Ratio is NM for each 1000ft altitude.

SPICE is not suitable for moving target.
It requires accurate coordinates for targeting.

These coordinates need to be set in Weapon steerpoints at flight planning.

SPICE capability depends on F-16 block
(KF-16 b52 are SPICE Operational)

Master Mode:	A-G
Master Arm:	ARM
SMS page:	Select SPICE (SP20 = 2000 Lbs & SP10 = 1000 Lbs)
	Set PWR ON & monitor alignment until RDY STATE
DED Page:	Select LIST – MISC – E for SPICE page

```
BP /IMAGEFRNT AUT  00
   45    0    1    A  1  A 3
   45*330*   2       A  1  A 7
```

For each weapon (thus each DED line) set the
weapon parameters: (note relevant station #3 or #7)
1. Impact angle (not implemented – will stay at 45°)
2. Impact Azimuth in degrees
3. Target STPT. (Weapon steerpoint # set in UI)

SMS page:	Crosscheck TGT ID with DED for each station #
	SET RIPPLE settings (it is advised not to ripple)
HUD:	Check LAR1 for SPICE with no impact azimuth
	Check LAR 2 for SPICE with impact azimuth.
ATTITUDE:	Level flight (don't dive).
Pickle:	Hold until weapon release.

AGM-84A HARPOON

Note:
AGM-84A HARPOON have an approximate range of 60-70Nm

Each AGM-84A Harpoon missile need to be powered up separately.
Power On time is approximately 20 minutes.

Power up missile is not required for setting SMS/WPN page but is
mandatory before firing.
Power up sequence is about 10 seconds before RDY state.
As a consequence it is advised to power up each missile just before firing.

Master Mode:	A-G
Master Arm:	ARM
SMS page:	Select Station # loaded with AGM-84A
WPN page:	SELECT Harpoon mode (RBL – BOL – LOS (OSB1))
RBL mode:	Set AREA (OSB #20) LARGE
	Set SRCH (OSB #19) NORM or as required
	Set FLY-OUT (OSB #18) HIGH or LOW
	Set TERM (OSB #17) POP or SKIM
BOL mode:	Set ENBL (Enable) range (OSB #20) in Nm
	Set DSTR (Self Destruct) range (OSB #19) in Nm
	Set FLY-OUT (OSB #18) HIGH or LOW
	Set TERM (OSB #17) POP or SKIM
LOS mode:	No setting to set – Fly wings level towards the general bearing of the targets.
FCR:	Select SEA Mode at 80 Nm range
	Search for targets SHIP and go EXPand mode.
	Designate desired target (TMS UP)
HUD:	Check in range (RBL only)
SMS page:	Power up missile & WAIT for RDY state.
WPN page:	Check no alert message
Pickle:	Hold until weapon release.(requires 1 to 6 seconds)

Note:
FCR SEA mode does not detect ship at anchor.
FCR SEA will detect moving ships (and ground targets)