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DMS – Display Management Switch
Falcon BMS 4.38.1 HOTAS Guide – Chapter 4
Canonical WIP Structure v0.1.0

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1 DMS – Display Management Switch

Status: 5% complete – Structural skeleton ready

1.1 Overview of This Chapter

This chapter provides comprehensive coverage of the Display Management Switch (DMS), the pilot’s primary interface for managing avionics displays and selecting the active Sensor of Interest (SOI) in the F-16. Unlike the Target Management Switch (TMS) covered in Chapter 3, the DMS is **deterministic** and **linear** in its behavior: each gesture always produces the same predictable result, regardless of Master Mode or system state.

The chapter is organized as follows:

1. **Section 4.1:** Concept and role of DMS in the F-16 avionics architecture
2. **Section 4.2:** DMS switch actuation – the primary section detailing all DMS controls
3. **Section 4.3:** DMS behavior in specific tactical contexts (by Master Mode and Sensor)
4. **Section 4.4:** Operational constraints and important notes
5. **Section 4.5:** Block and variant differences (minimal for DMS)

2 Concept and Sensor of Interest (SOI) Selection

Status: 0% complete – Narrative/Content pending

2.1 4.1.1 DMS Role and Ergonomics

Status

Narrative: 0% — Content Outline: Ready

Content Outline (TODO)

This subsection should establish:

- **Why DMS is simple:** Explain that unlike TMS (context-dependent, timing-critical), DMS is completely deterministic. Same input always produces same output.
- **Ergonomic placement:** DMS located on flight stick within thumb reach. Allows pilots to manage displays without redirecting hand position.
- **Operational criticality:** DMS enables rapid SOI cycling during high-workload situations (unlike distant MFD touchscreen controls).
- **Contrast with TMS:** While TMS is complex and context-sensitive, DMS provides simple linear control for display management.
- **Historical stability:** DMS behavior unchanged since at least BMS 4.36, making this guide broadly applicable.

Narrative to Write

TODO: Approximately 300–400 words. Topics: physical location of DMS on stick, thumb-activated operation, why deterministic design matters operationally, pilot workload reduction, simplicity vs TMS complexity.

2.2 4.1.2 Sensor of Interest (SOI) Hierarchy

Status

Narrative: 0% — Content Outline: Ready

Content Outline (TODO)

This subsection should explain:

- **What is SOI:** Define as the actively controlled sensor whose data is displayed and manipulated via stick controls (particularly TMS).
- **SOI Hierarchy:** Explain cycling order via DMS UP/DOWN:
 1. Targeting Pod (TGP)
 2. Fire Control Radar (FCR)
 3. Radar Warning Receiver (RWR)
 4. Navigation (NAV)
 5. Cycle repeats
- **SOI Persistence:** Selected SOI persists across Master Mode changes. If FCR selected in A-A, then switch to A-G, FCR remains SOI until cycled to different sensor.
- **Context Changes with SOI:** DMS UP/DOWN meaning changes based on SOI:
 - FCR SOI: cycle between radar modes (STT, PRH, ACM, etc.)
 - TGP SOI: cycle between targeting modes (POINT, AREA, PICTURE, etc.)
 - RWR SOI: cycle between threat display formats
 - NAV SOI: cycle between navigation display formats
- **Visual Feedback:** Current SOI always visible on MFD, typically indicated by highlighted border or label.

Narrative to Write

TODO: Approximately 400–500 words. Topics: SOI concept, cycling hierarchy, persistence across modes, context-dependent meanings, visual indicators, tactical implications.

3 DMS Switch Actuation – SOI Selection and Format Stepping

Status: 10% complete – Hotastable templates ready, narratives pending

This is the **primary section** of the DMS chapter. It details all DMS button combinations, organized by functional intent (SOI selection, Format stepping, Declutter mode) rather than by Master Mode or Sensor context. Context-specific variations are addressed in Section 4.3.

3.1 4.2.1 DMS UP/DOWN – Sensor of Interest (SOI) Selection

Status

Narrative: 0% — Hotastable: Template ready

Content Outline (TODO)

- **Brief introduction** (approx. 100 words): Explain that DMS UP/DOWN cycles through SOI hierarchy. Result always: UP = previous SOI, DOWN = next SOI.
- **Hotastable with 2 rows:**
 - Row 1: Any Master Mode, Any SOI — UP (short press) — Selects Previous SOI
 - Row 2: Any Master Mode, Any SOI — DOWN (short press) — Selects Next SOI
- **Cross-references:** Point to Section 4.1.2 (SOI Hierarchy) and Section 4.3 (context-specific behaviors).
- **Training references:** Link to BMS Training Missions requiring heavy SOI cycling (recommend: mixed-sensor scenarios).

Narrative to Write

TODO: Approximately 200–300 words. Topics: SOI cycling operation, tactical flow, rapid sensor switching, workload reduction.

Hotastable Template

State	Dir	Act	Function	Effect	Nuance	Dash34/
State	Dir	Act	Function	Effect	Nuance	Dash34/Trai
<i>TODO: Complete table rows. Use template rows below as starting point.</i>						
Any SOI	UP	Shrt	Select Previous SOI	DMS UP advances backward through SOI hierarchy: TGP to NAV to RWR to FCR to TGP. SOI change immediate. MFD updates to new SOI's last-used display format.	Selection persists across Master Mode changes. SOI context retained per sensor (e.g., if FCR was in STT mode, returning to FCR preserves STT).	34 2.1.6 / TBD

Continued on next page

State	Dir	Act	Function	Effect	Nu- ance	Dash34/ 34 2.1.6 / TBD
Any SOI	DOWN	Shrt	Select Next SOI	DMS DOWN advances forward through SOI hierarchy: TGP to FCR to RWR to NAV to TGP. SOI change immediate. MFD updates. Works regardless of OSB visibility or declutter state.	Same persistence behavior as UP. Cycling deterministic; no timing sensitivity.	

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3.2 4.2.2 DMS LEFT/RIGHT – MFD Format Stepping

Status

Narrative: 0% — Hotastable: Template ready

Content Outline (TODO)

- **Brief introduction** (approx. 100 words): DMS LEFT/RIGHT steps through available MFD display formats for currently selected SOI. Each sensor (FCR, TGP, RWR, NAV) maintains own format list.
- **Hotastable with 2 rows:**
 - Row 1: [Current SOI], [Any Format] — LEFT (short press) — Previous MFD Format
 - Row 2: [Current SOI], [Any Format] — RIGHT (short press) — Next MFD Format
- **Format Memory:** Each MFD format maintains independent state (zoom level, range setting, symbol visibility, etc.). Returning to previously-used format retains all state settings.
- **Cross-references:** Section 4.3 for format options specific to each sensor/Master Mode.
- **Training references:** Missions emphasizing MFD format management.

Narrative to Write

TODO: Approximately 250–350 words. Topics: format cycling, state retention, tactical use, high-G maneuvering benefit.

Hotastable Template

State	Dir	Act	Function	Effect	Nu- ance	Dash34/ Trai
State	Dir	Act	Function	Effect	Nuance	Dash34/Trai
<i>TODO: Complete table rows. Use template rows below as starting point.</i>						
[Current SOI]	LEFT	Shrt	Previous MFD Format	DMS LEFT cycles backward through available MFD formats for current SOI. Display changes immediately to previous format. Format-specific state (zoom, range, symbol filters) retained.	Formats available depend on SOI and Master Mode. See Section 4.3 for complete format listings per context.	34 2.1.6 / TBD
[Current SOI]	RIGHT	Shrt	Next MFD Format	DMS RIGHT cycles forward through available MFD formats for current SOI. Display changes immediately. Format-specific state retained. Useful during high-workload or high-G maneuvering.	Same format cycling logic as LEFT. Allows rapid step- ping without using MFD touch- screen (beneficial during combat).	34 2.1.6 / TBD

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3.3 4.2.3 DCLT (Declutter) Mode – Visual Management

Status

Narrative: 0% — Hotastable: Template ready

Content Outline (TODO)

- **What is Declutter:** DCLT is visual simplification mode that removes labels and symbols from MFD while retaining critical flight data. Useful for situational awareness during congested displays or multi-target environments.
- **Two declutter modes:**
 1. Toggle Declutter: brief press (less than 1 second) toggles clutter on/off
 2. Customize Declutter: long hold (1 second or more) accesses programmable declutter page
- **State persistence:** DCLT state is format-specific (not SOI-specific). If you set declutter in FCR STT format, leaving and returning to STT retains declutter state. Switching to FCR PRH may have independent declutter state.
- **Hotactable with 2 rows:**
 - Row 1: [Any Format] — (any direction) — Brief (less than 1s) — Toggle Declutter
 - Row 2: [Any Format] — (any direction) — Long (1s or more) — Access Declutter Configuration
- **Cross-references:** Note this is the ONLY DMS function with timing criticality. Contrast with SOI/Format operations (instant, timing-independent).

Narrative to Write

TODO: Approximately 300–400 words. Topics: declutter functionality, toggle vs customize timing, state format-specific, tactical use, visual confirmation requirement.

Hotactable Template

State	Dir	Act	Function	Effect	Nu- ance	Dash34/ Trai
State	Dir	Act	Function	Effect	Nuance	Dash34/Trai
<i>TODO: Complete table rows. Use template rows below as starting point.</i>						

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State	Dir	Act	Function	Effect	Nu- ance	Dash34/ Dash34
[Any Format]	[Any]	Brief	Toggle Declutter On/Off	DMS brief press alternates visual declutter state. When decluttered: OSB labels, threat symbols, non-essential annotations hidden. Critical flight data remains (range, heading, airspeed symbology).	Declutter state is format-specific, not SOI-specific. Useful in multi-target intercept scenarios. No voice warning or visual indicator of state; pilot must confirm visually.	34 2.1.6 / TBD

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State	Dir	Act	Function	Effect	Nu- ance	Dash34/ /TBD
[Any Format]	[Any]	Long	Access Declutter Config	DMS long hold opens declutter customization page. Pilot can enable/disable decluttering of specific elements (radial lines, grid, labels, threat circles, etc.). Selection stored per format.	Cus- tomiza- tion avail- able per individ- ual pilot prefer- ence. Some pilots prefer minimal declut- ter (grid plus labels); others prefer maxi- mum (only FPM and range). Accessi- ble only via long hold; not avail- able via OSB.	34 2.1.6 / TBD

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4 DMS in Tactical Contexts

Status: 0% complete – Context-specific narratives pending

This section elaborates on DMS behavior in specific operational contexts, organized by Master Mode and Sensor. While Section 4.2 presented DMS control generically, this section provides concrete examples of what DMS UP/DOWN and LEFT/RIGHT mean when actually flying.

4.1 4.3.1 DMS with FCR in Air-to-Air Mode

Content Outline (TODO)

- **Introduction:** In A-A Master Mode with FCR as SOI, DMS UP/DOWN cycle between radar search/track modes (not between sensors). Each mode has associated MFD formats.

-
- **Radar modes in A-A:** List and briefly describe: STT (Single Target Track), PRH (Patrol Range Height), ACM (Air Combat Maneuvering), DGFT (Dogfight), etc.
 - **Hotastable:** Rows for each radar mode cycling and associated format changes
 - **Format examples:** Explain what MFD formats are available in STT vs PRH vs ACM modes
 - **Tactical flow:** Describe typical DMS usage in intercept/BVR engagement scenario

Narrative to Write

TODO: Approximately 400–500 words. Topics: FCR A-A context, radar modes, format cycling, tactical engagement flow.

4.2 4.3.2 DMS with TGP in Air-to-Ground Mode

Content Outline (TODO)

- **Introduction:** In A-G Master Mode with TGP as SOI, DMS UP/DOWN cycle between targeting pod modes (POINT, AREA, PICTURE, etc.), not between sensors.
- **TGP modes in A-G:** Define POINT (single-pixel target), AREA (geometric shape for complex structures), PICTURE (wide-area overview), STANDBY, etc.
- **Hotastable:** Rows for each TGP mode cycling and associated format changes
- **Format examples:** Explain MFD formats unique to TGP (e.g., PIP – Picture-in-Picture for context)
- **Tactical flow:** Describe typical scenario (find target with PICTURE, transition to AREA for structure tracking, narrow to POINT for laser lasing)
- **DCLT interaction:** Note that DCLT particularly useful in TGP mode to simplify display during high-precision lasing

Narrative to Write

TODO: Approximately 400–500 words. Topics: TGP A-G context, targeting modes, format cycling, laser employment flow.

4.3 4.3.3 DMS with RWR (Always Available)

Content Outline (TODO)

- **Introduction:** RWR (Radar Warning Receiver) available in all Master Modes as a SOI. DMS UP/DOWN in RWR mode cycle between threat display formats, not modes.
- **RWR display formats:** List format options (Lobe display, Table format, Azimuth/Elevation, etc.)
- **Hotastable:** Rows for RWR format cycling
- **Tactical importance:** RWR is crucial for situational awareness of threat radar. Quick format cycling allows pilot to assess threat geometry without using OSBs.
- **Context across Master Modes:** Note that RWR SOI selection and format cycling work identically regardless of Master Mode (A-A, A-G, NAV, DGFT)

Narrative to Write

TODO: Approximately 300–400 words. Topics: RWR as SOI, format cycling, threat assessment, cross-mode consistency.

4.4 4.3.4 DMS in Navigation Mode

Content Outline (TODO)

- **Introduction:** Explain DMS behavior when in NAV Master Mode. Focus shifts from weapons/targeting to navigation displays (HSD, HSI, INS, waypoint management).
- **Navigation formats:** List available formats (Horizontal Situation Display, Heading/Situation Indicator, INS readout, Waypoint/Steerpoint pages, etc.)
- **Hotastable:** Rows for navigation format cycling
- **SOI cycling in NAV mode:** Explain if SOI selection behaves differently (typically navigation sensors like INS/GPS prioritized)
- **Tactical flow:** Describe typical NAV mode scenario (preflight planning, cruise, approach to target area)

Narrative to Write

TODO: Approximately 300–400 words. Topics: NAV mode context, available displays, format cycling, mission planning flow.

5 DMS Constraints and Operational Notes

Status: 0% complete – Bullet-point narratives pending

This section clarifies important operational constraints and behaviors that pilots must understand.

5.1 4.4.1 SOI State Persistence

Content Outline (TODO)

- SOI selected in one Master Mode persists when you switch Master Modes
- Example: A-A with FCR selected, switch to A-G, FCR remains selected (unless FCR unavailable in A-G)
- Consequence: Pilot must consciously re-select appropriate SOI when changing Master Modes
- Safeguard: Visual indication on MFD shows current SOI at all times

Narrative to Write

TODO: Approximately 150–200 words on SOI persistence across modes.

5.2 4.4.2 Format Memory

Content Outline (TODO)

- Each MFD format (e.g., FCR STT, FCR PRH, TGP POINT) maintains independent state
- State includes: zoom level, range setting, symbol visibility, azimuth orientation, etc.

-
- When pilot cycles back to previously-used format, all state is restored
 - Benefit: Allows rapid format cycling without losing context
 - Caveat: Pilot must be aware that left/right stepping may restore unexpected zoom/range settings

Narrative to Write

TODO: Approximately 150–200 words on format memory behavior.

5.3 4.4.3 Declutter State Retention

Content Outline (TODO)

- DCLT state (on/off and customization settings) stored per format, not per SOI
- Switching to different format may have different DCLT state
- Customized declutter settings persist across flights (user-configurable)
- Tactical implication: Pilot can set up preferred declutter states for each critical format

Narrative to Write

TODO: Approximately 150–200 words on DCLT state retention.

5.4 4.4.4 No Timing Criticality (Contrast with TMS)

Content Outline (TODO)

- DMS has zero sub-second timing criticality (except DCLT brief vs long, approx 1 second)
- DMS UP held 0.1s equals DMS UP held 2.0s; result identical
- DMS LEFT brief tap equals DMS LEFT sustained hold; result identical
- Contrast: TMS with timing less than 0.6s versus greater than or equal to 0.6s fundamentally changes mode (SCAN vs LOS)
- Implication: Pilot can safely manipulate DMS without worrying about timing precision
- Safety benefit: DMS is forgiving and reliable; no risk of mode switching due to hold duration

Narrative to Write

TODO: Approximately 200–250 words explaining DMS determinism and lack of timing sensitivity.

6 DMS Block and Variant Notes

Status: 0% complete – Content likely minimal

Unlike the CMS (Chapter 5), which has significant variation between External ECM Pod and Internal IDIAS configurations, the DMS is **remarkably consistent** across all F-16 blocks and variants. This section will be brief.

6.1 4.5.1 DMS Behavior Across All Blocks

Content Outline (TODO)

- **Universal consistency:** All F-16 blocks and variants (Block 40/42/50/52, export variants, etc.) implement DMS identically
- **Physical switch:** 4-direction hat switch on flight stick (standard across all variants)
- **UP/DOWN function:** SOI cycling is identical
- **LEFT/RIGHT function:** MFD format stepping is identical
- **DCLT:** Declutter functionality is identical
- **Implication:** Pilot training on DMS transfers directly between any F-16 variant
- **No table needed:** Unlike CMS, no variant comparison table required

Narrative to Write

TODO: Approximately 200–250 words on DMS consistency across blocks and variants.

Appendix: WIP Development Notes

Pending Tasks

1. Verify Dash-34 section references (placeholder: 2.1.6 for MFD – is this correct in DASH-34-1?)
2. Identify 5–8 BMS Training Missions with heavy DMS usage (mixed sensor scenarios)
3. Complete list of FCR radar modes in A-A Master Mode (STT, PRH, ACM, DGFT, others?)
4. Complete list of TGP operational modes in A-G Master Mode (POINT, AREA, PICTURE, STANDBY, others?)
5. Complete list of RWR display format options
6. Complete list of navigation displays available in NAV Master Mode
7. Obtain/create F-16 stick photo showing DMS location (compare with CMS image from Chapter 5)
8. Verify cross-references to Chapter 3 (TMS context) and Chapter 5 (CMS)

Open Questions

1. Does SWAP have a meaningful definition in BMS context? Original plan mentioned it but never defined. Refined structure eliminates it. Acceptable?
2. Should we include tactical scenario examples (similar to CMS Section 5.2.4)? Proposed location: end of Section 4.3 or beginning of 4.4.
3. Are there DMS behaviors in DGFT (Dogfight) Master Mode warranting separate 4.3.5 subsection, or covered sufficiently in 4.3.1 (FCR A-A)?
4. Should we document DMS edge cases or BMS-specific quirks (e.g., format wraparound, SOI unavailability in certain modes)?

Integration Notes

- This WIP file provides canonical structure and content outline for Chapter 4 DMS
- All hotatables are templates; actual content rows must be researched from 34 and BMS Training Manual 4.38.1
- Narratives are outlined with TODO markers; authors should write 250–500 words per indicated target length
- Once complete, this structure will be split into multiple WIP files per section (following wip-naming-v1.4 convention)
- Target integration: v0.3.0.0 of the guide (once all narrative content is drafted, reviewed, and validated against 34 and BMS Training Manual)