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G-44(M) Update:

Tactical Equipment Maintenance Facility (TEMF) Complex

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**Provide G-44(M) staff insights on how the
Tactical Equipment Maintenance Facility
(TEMF) Complex Army Standard and
Standard Designs were developed and way
ahead for this facility type**





Tactical Equipment Maintenance (TEMF) Complex

- Predisposed to functional and operational requirements & priorities
- Consolidates five major (5) Warfighter mission functions (*maintenance & repair, training, mission planning & rehearsal, deployment preparation/staging, UAS*)
- Defines “*adaptive, multipurpose*” facility standards & criteria
- Defines Warfighter Review Process .. *schoolhouse-functional user-leader*
- Baselined on “*today’s*” needs and flexibility to accommodate “*tomorrow’s*” requirements ..
- Addresses habitual unit and equipment modernization and technology uncertainty
- Full implementation in FY09 except for BLST and CSW* requirements (FY10?)
- Focused on BCT requirements with ability to adapt or tailored to functional/supporting brigade requirements and TDA (packaging)

* CSW – Crew Served Weapon, remote (e.g., CROWS)



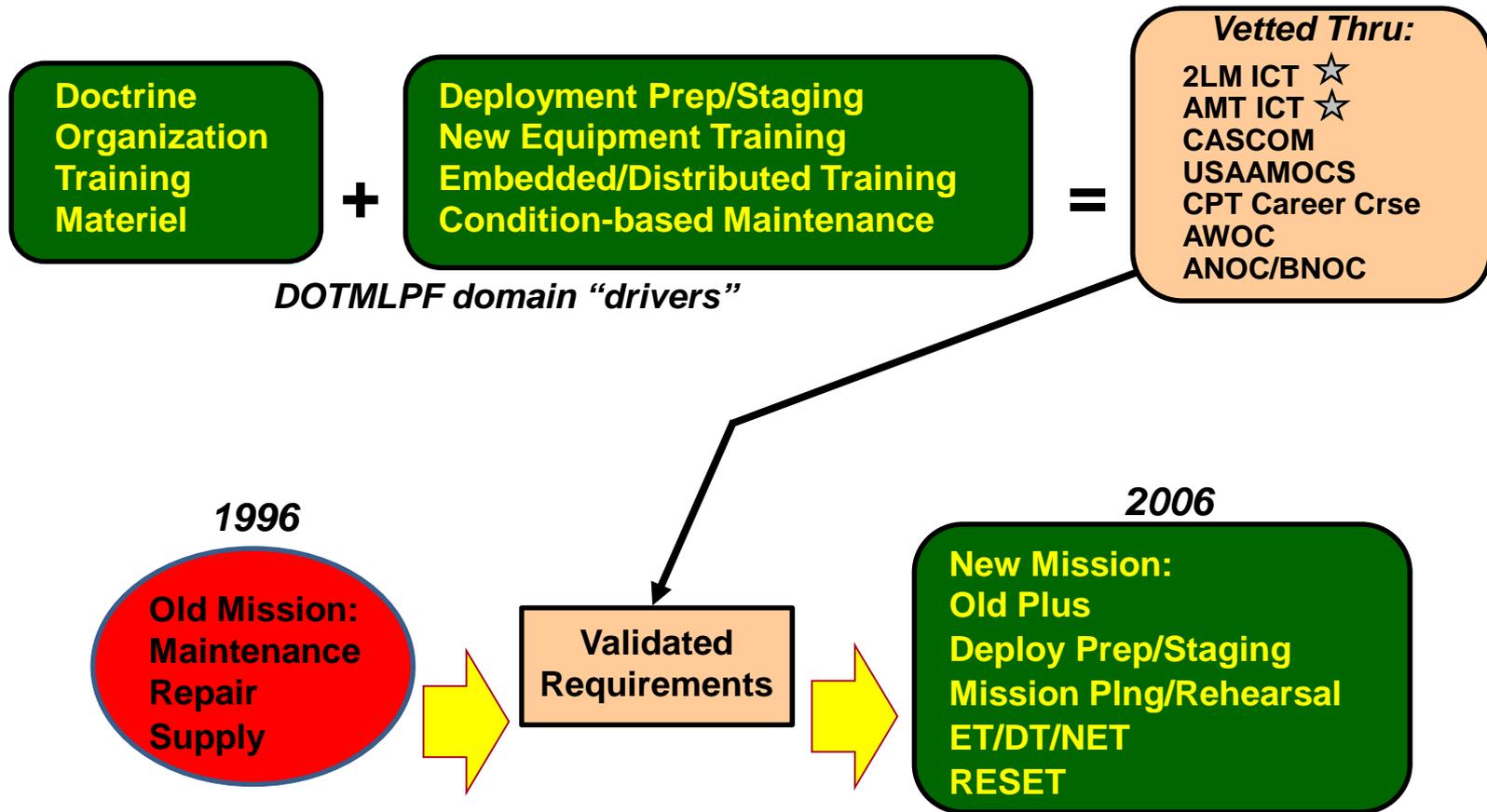


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Requirements Identification-Definition-Validation (Example)

Tactical Equipment Maintenance Facility (TEMF)

2006 Objective: Address conversion from 4LM to 2LM/CBM, loss of DISCOM & COSCOM, & Reuse w/o MILCON + Brigade Centric focus





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Functional Comparison Between 1996 & 2006 TEMF

- TEMF transformed from a single-purpose facility into a multi-mission complex
- *Reduced deployed footprint* places greatest demands on TEMF complex standards & criteria for successful BCT fielding
- Uses adaptive, multipurpose methodologies approach to significantly reduce Army Transformation impacts .. *accelerated Transformation, technology spin-outs, mission planning, reach, OPTEMPO*
- Begins to shift primary facility allowance basis (maintenance) from “personnel-driven” (# of mechanics) to “functionally-driven” (*throughput*), requirements-based design
- Incorporates Logistics Transformation (e.g., 2LM, E2E, CBM)
- Reduces land area consumption over traditional approach for same unit .. smaller footprint with no functional loss
- Enables secure and non-secure connectivity from GIG to parking pad
- Enables embedded, distributed, and recurring new equipment training





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2LM /MaintTransf ICT – BCT Complex Major Features

Primary functions: command & control, reach operations, maintenance/repair, embedded/ distributive training, deployment equipment & supply storage, unit and Soldier storage, and higher echelon repair. Includes 2LM, focused logistics, CBM and E2E initiatives.

No longer based solely on unit requirements [G-4]

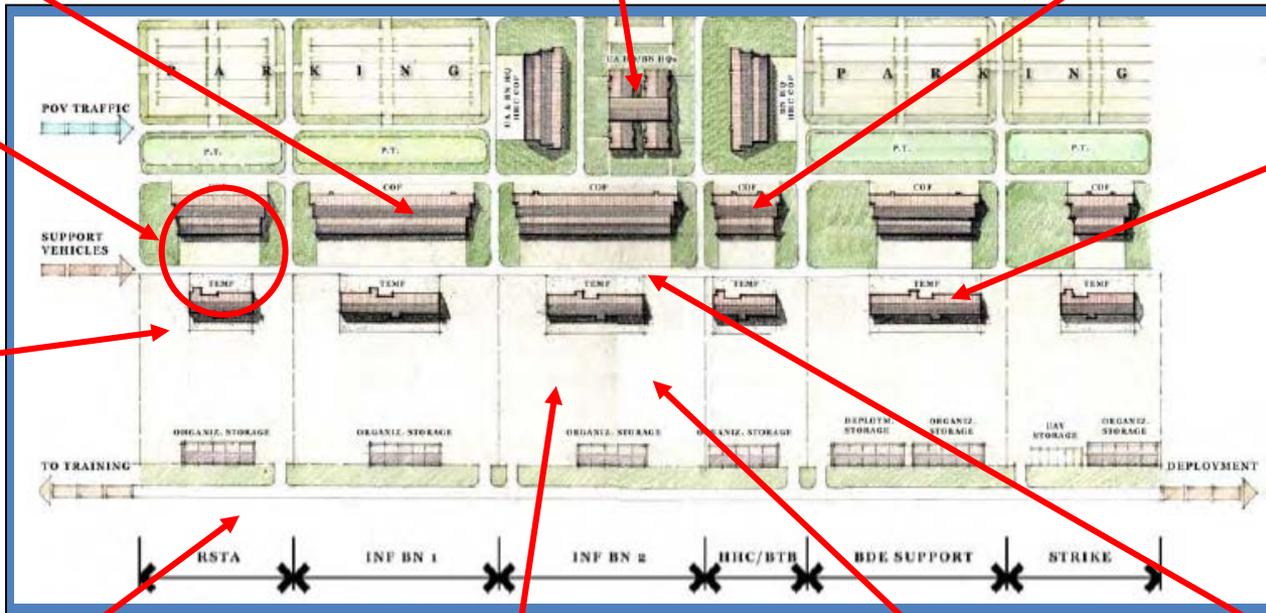
Expansion: Convert to 3rd CAB [G-8(FCS) / TRADOC]

Consolidated CO Ops w/Soldier Work Area [G-1/G-3/FORSCOM]

Consolidated C2 [FORSCOM]

COF-TEMF functional relationship [G-3]

Higher (-30/-40) Maintenance Capability [G-4/CASCOM]



Deployed Supply [G-4/G-8(FCS)]

Traffic Flow Control; Deployment Staging/Prep [G-4/G-8(FCS)]

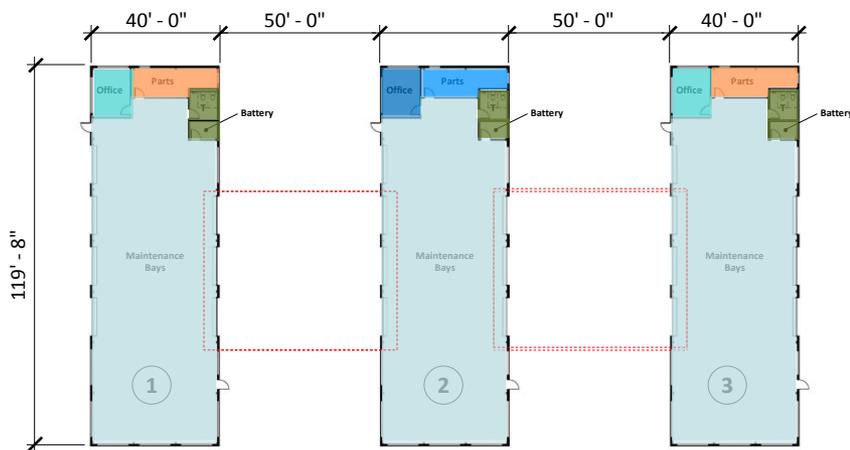
CL I&II UAV Maintenance [G-4/G-8(FCS)]

CL I&II UAV Launch/Recovery (Tank Trail/Range Road) [G-3/ACSIM]

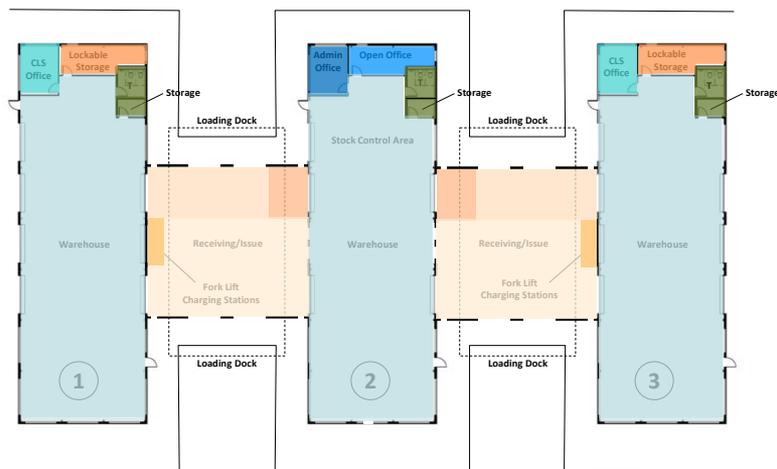
NIPR/SIPR/Slave Power [G-3/ G-4/TRADOC/G-8(FCS)]

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TEMF 3 – Existing Floor Plan



Tactical SSA – Conceptual Floor Plan

Planning Alternative A1 – Tier 1

- Construct new Receiving/Issue Bays w/Dock Canopy between existing TEMF Buildings
- Utilize the existing Maintenance Bays in Bldgs. 1, 2, and 3 for Warehousing
- Utilize the existing Office and Parts Storage in Bldg. 2 for Supply Support Admin Offices
- Occupy the existing Office in Bldgs. 1 and 3 for Contractor Logistic Support (CLS) Office
- Utilize existing Parts Storage for Lockable Storage in Bldgs. 1 and 3
- Convert existing Battery Storage to General Storage in Bldgs. 1, 2, and 3. Existing Toilets to remain.





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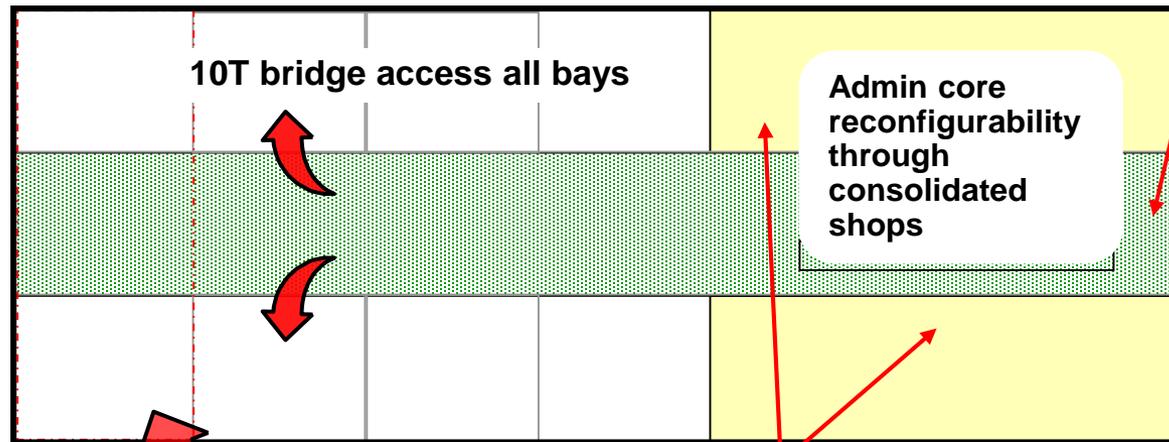
2LM /MaintTransf ICT – 2006 TEMF Layout Major Features

Security line: Between COF admin core & readiness modules encompasses BCT parking/training area

BSB (or equivalent):

- 2d Tier Field Maint -One dual use bay
- 35T bridge one wing

Power & data connectivity: All bays, admin core, & tactical vehicle parking for ET/DT, mission planning/rehearsal & reach operations



Maintenance/Inspection bay:

- *Rapid turn-around time maintenance/inspection bay*
- Recurring NET Training (technology spin-outs)
- Deployment inspection, staging, & preparation adjacent to COF Readiness Module
- Traffic flow control in to/out of parking

New out building/ services:

- Deployment supply storage
- UAS launch/recovery proximity to training complex (tank trail)
- UAS (CL I/II) Maintenance/stores

32' x 96' bay module with repair bays perpendicular to rapid maintenance & inspection bay

Admin Core:

- Non-Sensitive Secure Storage (pilferable, accountable, serial numbered, technology sensitive)
- Includes 12% CLS factor
- Production control & quality assurance/control (2d floor)
- Dockside access to SATS (Standardized Tool Sets) & ASLMS (Combat Spares) vans
- IFTE capable dock
- Multi-function classroom, training management, node control

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Structural Bay Thru-Put Comparison



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Basis

- G-4 directs conversion to 2LM by 4QFY06
- No current Army facility throughput algorithm exist to support 2LM (“pit stop” maintenance) calculation
- Current generation equipment beginning production mods to reflect 2LM
- ThruPut algorithm based on 8-hr maintenance/repair day (approx 10-hr workday)
- Separates repair and maintenance/inspection into two separate bays
- Repair Bay = Tasks that are *more* than 2-hrs in duration with *minimum* average clock-time of 4-hrs and *maximum* average clock-time of 8-hrs
- Maintenance/Inspection Bay = Tasks that are *less* than 2-hrs in duration with *minimum* average clock-time of 1-hr and *maximum* average clock-time of 2-hrs

<u>TEMF Bands</u>	<u>1996</u>	<u>2006</u>	<u>PriFac Size</u>	<u>ASIP Units</u>	<u>Configuration Method</u>
Small (3 ea 32x64)	12-24		12.0K SF	162*	Tailored (TOE-Driven)
(2 ea 32x96)		40-80	18.0K SF	355*	Fixed (2006 Banded)
Medium (7-8 ea 32x64)	28-56		34.5K SF	306	Tailored
(4 ea 32x96)		80-160	35.0K SF	306	Fixed
Large (9-10 ea 32x64)	40-80		35.0K SF	130	Tailored
(7 ea 32x96)		132-264	57.0K SF	130	Fixed
X-Large (8ea 32x96)		160-320	76.5K SF	37	Fixed

* Under the 1996 SD, 193 x-Small TEMFs at 10K SF PriFac w/<1-32x64 bay; BCT rolls into a single Med TEMF; ASIP requirement rolled with Small for comparison purposes w/actual allocation project dependent

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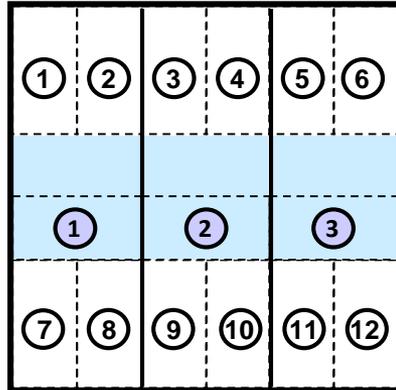


BSB TEMF Thru-put Projections

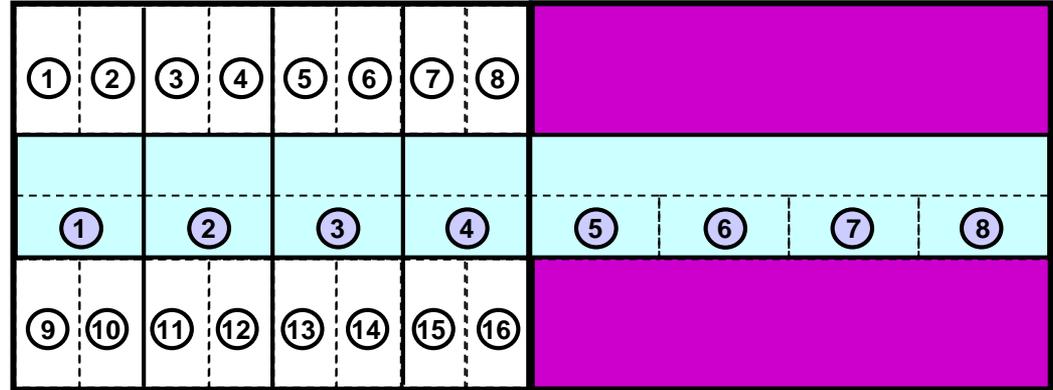


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BSB Increase to Large TEMF capacity by algorithm change



Current BSB Medium TEMF thru-put capacity



2008 AS Thru-put Calc $\left\{ \begin{array}{l} \square \text{ Total number of positions x 1 per work day} \\ \square \text{ Total number of positions x 3 per work day (low end); x 4 (hi end)} \end{array} \right.$

1996 AS Thru-put Calc \square Total number of positions x 1 per work day

Current BSB (Medium) repair bay capacity:

- Maximum of **16** vehicles in repair activity (>4-8 hour task)/day
- Maximum of **24-36** vehicles in maintenance/inspection activity (\leq 2-3 hour task)/day

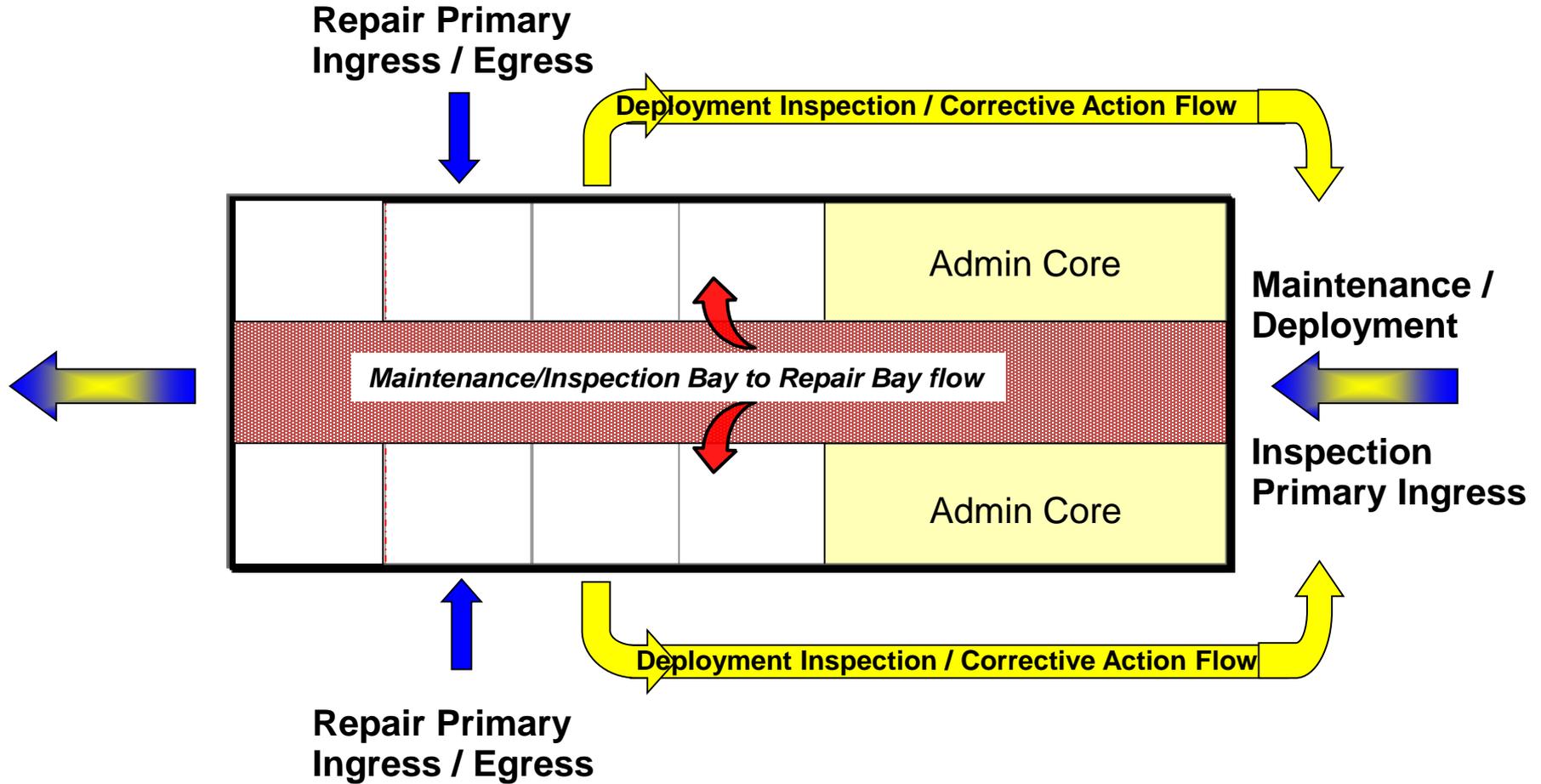
2009 Recommended Algorithm Change BSB (Large)

- Maximum of **38** vehicles in repair activity/day
- Maximum of **33-44** vehicles in maintenance/ inspection activity/day



2006 TEMF Design Traffic Flow

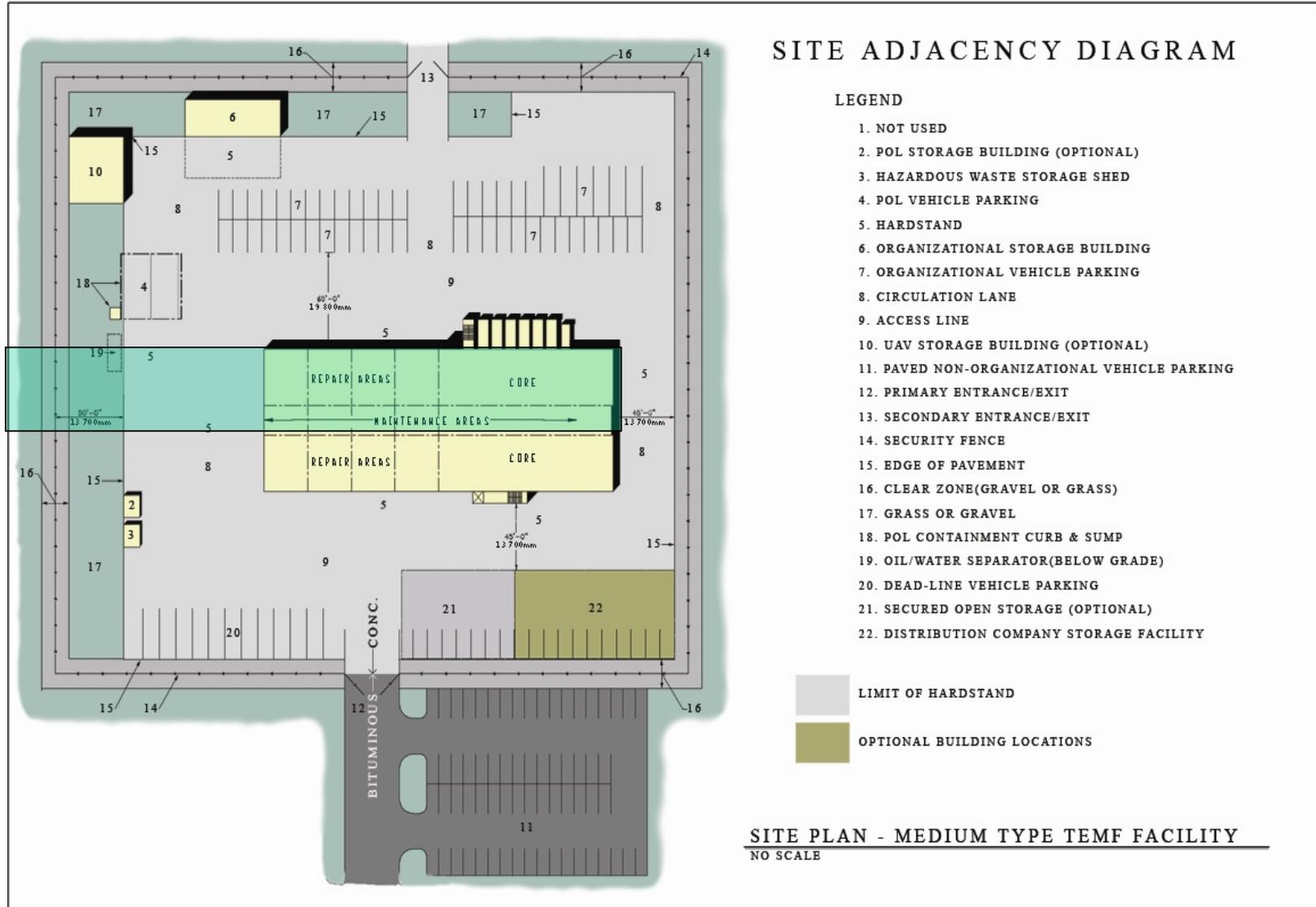
Maintenance/Inspection – Repair – Deployment





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Footprint Comparison - 1996 versus 2006 Standard Design





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Objectives for R&M Requirements Prioritization

Prioritize mandatory requirements by operational and readiness need to achieve full mission capability (FMC)

TEMF
Army
Standard
 UFC 4-214-02

Keep Fix

*Reuse
 Renovate
 Modernize*

R&M Priorities
 1 – Secure Strg
 2 – CL IX
 3 – xxxx
 N – Inspec Pit

Who is affected and why do we care

- IMCOM
- Proponent
- Mission Command
- USACE?

Build

*Repurpose (OMA)
 New (MCA)*

Construct Priorities
 1 – BSB
 2 – FSB
 3 – Sustainment
 4 -xxxx
 N - xxxx

Who is affected and why do we care

- ACOM
- ACSIM
- USACE
- Proponent
-

Dispose

*Divest
 Demo*

Surplus

Who is affected and why do we care

- Break down and prioritize Army Standard requirements into separate components based on operational and readiness need
- Determine what must be “built” thru MCA vice incremental capability increase thru R&M

Conceptual R&M Prioritization Decision Table



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Tactical Equipment Maintenance Facility Primary Requirements for R&M Application								
Prioritized Functional Space (1-n)	Building Selection & Optimization			Location By Unit Priority & Building Selection				
	Standard Desgn Allocation (FMC)	Minimum Space Acceptable	Alternative Means to Satisfy	BSB/FSB	Maint CO (SuS Bde)	Maneuver Bn	Other Bn	Consolidated SEP CO
Arms Room	300 SF	150 SF	ARMAG (OPA)	x	x	x	Opt	x
Comms Storage	300 SF	150 SF		x	x	x	Opt	x
Non-Sensitive Secure Storage	300 SF	150 SF		x	x	x	Opt	
Overhead Lift (NO JIB except HMMWV Units)	10T/35T	7T		x	x	x	Opt	x
Repair Bay	32 x 32	20 x 32	Covered Shed	x	x	x		x
Propertybook Storage				x	x	x		
Tool Storage				x	x	x		x
VETRONICS Bench & Dock				x	x	x	Opt	Opt
CL IX Bench Stock				x	x			Opt
Consolidated Bench				x	x	x	Opt	x
Tech Supply				x	x	x	Opt	x
Comms & Data Distribution	All bays & Admin Core	50% bays & Private Ofc		x	x	x		Opt
POL Distribution	Adjacent to M&I Bay	Manual		x	x			Opt
Welding Area	Designated Bay when Auth	None		x	x		Opt	
Inspection Pit	Admin Core M&I Bay	Designated Repair Bay	Manual	x	x	x	Opt	x
PC/QC/QA	300 SF 2d Flr w/window	300 SF 1st Flr adjacent to Repair Bays		x	x		Opt	Opt
Consolidated Admin	1200 SF (2d Flr)			x	x	x	Opt	x
Waste POL Holding Area				x	x	x		x
BLST Admin Space				x	x		Opt	Opt
Tactical SSA (separate area)	22K SF w/in 5mi	16K SF w/in 5 mi		x	x			
Multi-Purpose/Training Room				x	x	x	Opt	
Maintenance & Inspection Bay	32 x 32	none	None	x	x	x	Opt	x
Elevator				x	x	x	Opt	x

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Functional Facility Investment Strategy – Collaborative Effort

Doctrinally/Mission Based and Integrated Investment Strategy

☆☆☆ (DCS G-4)

Functional proponent's requirements & programmatic investment position

(Proposed) **ARSTAF Role**

"TEMF requirements & criteria don't change until I review and approve them"

LTG Stephenson
DCS, G-4

MILCON Investment Priorities:

Doctrinally & mission based MILCON priorities that are must haves to achieve "full mission support capability" (e.g., for vehicle maintenance it was RESET and thru-put)

G-4 Role

Bridging strategy to achieve "full mission capability" overtime thru a structured plan that prevents obsolescence, insurmountable backlog, or mission irrelevance that questions continued facility sustainment expenditure.

FDT Role

Renovation/Modernization Priorities:

Validated facility requirements from an approved Army Standard that are prioritized by doctrinal and mission criticality of need to achieve "partial (best possible) mission capability" within available resources and time.

Current facility posture based on MILCON investment to date and approved within FYDP for execution

IMCOM Role

G-4 Role

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Recommended G-44(M) AFS 2020 & FIS Way Ahead

- **Complete R&M requirements prioritization and substitution options (I&R, Re-station & Keep or Fix)**
- **Identify priority unit types for legacy buy-out & application (building selection to Keep or Fix)**
- **Assist IMCOM with tailored legacy solutions for consolidations and surplus identification (OACSIM surplus reduction to Dispose)**
- **Assist IMCOM in selection facilities for repurposing (other gap or shortfall mitigation – Divest)**
- **Assist COS in optimizing selected legacy facility envelopes to maximum extent feasible/affordable (Fix)**
- **Complete bridging strategy for TEMF Facility Modernization Investment Strategy to full mission capability (Invest – Build)**

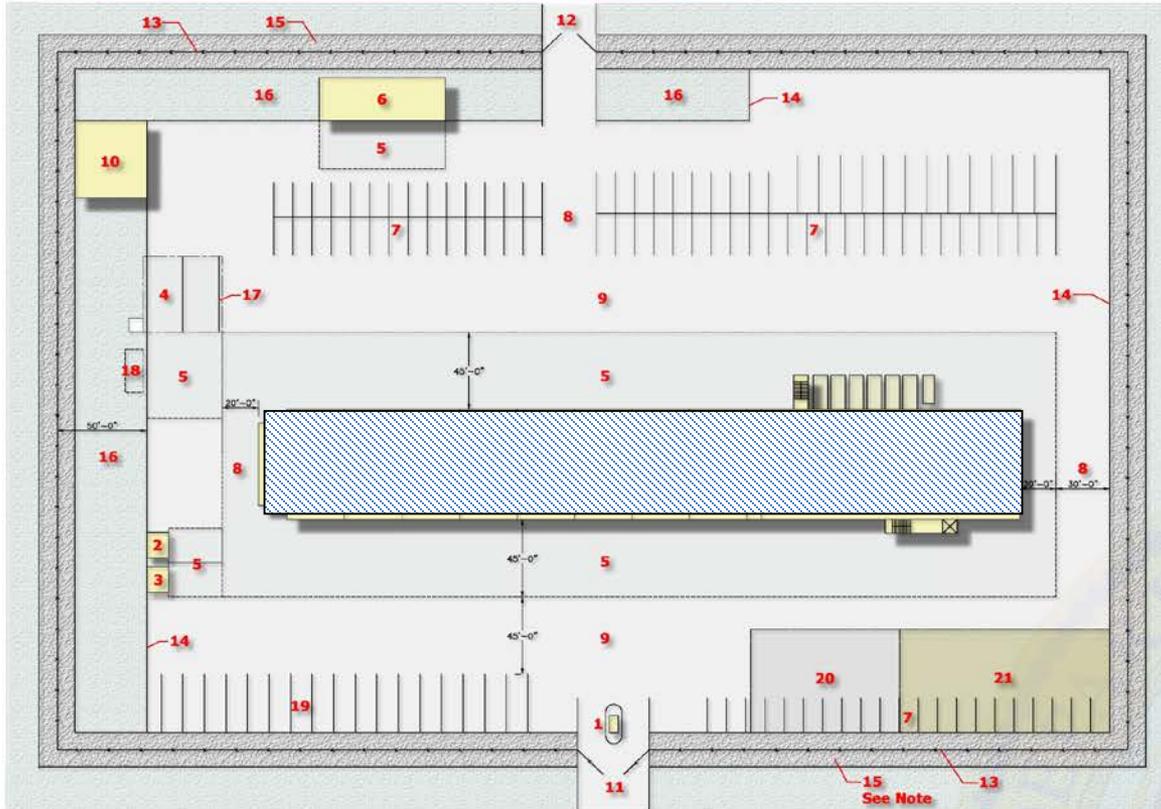








Tactical Equipment Maintenance Facility (TEMF) Scheme A: Drive-Thru Bays - Site Plan



Site Plan Legend:

1. Entry Booth
2. POL Storage Building (optional)
3. Hazardous Waste Storage Shed
4. POL Vehicle Parking
5. Access Apron / Hardstand
6. Organizational Storage Building
7. Organizational Vehicle Parking
8. Circulation Lane
9. Access Line
10. UAV Storage Building (optional)
11. Primary Entrance / Exit
12. Secondary Entrance / Exit
13. Security Fence
14. Edge of Pavement
15. Clear Zone (Gravell or Grass)
16. Grass or Gravell
17. POL Containment Curb & Sump
18. Oil / Water Separator (Below grade)
19. Dead-line Vehicle Parking
20. Secured Open Storage (optional)
21. DEMRB (optional)

Note:

If the TEMF is facing a COF, there would be no fence on this side of the compound. The TEMF and COF would share a common service yard. The location of some site items would be adjusted accordingly.

★ Site Functional Areas - Optional Dock:
One docking station will be provided for maintenance and electronic testing where required by unit mission.

★ Site Functional Areas - Vehicle Parking:
+ Organizational Vehicle Parking
+ POL Vehicle Parking
+ Parking Pad Data & Power Connections.

★ Site Functional Areas - Site Storage:
+ Hazardous Waste Storage Shed
+ Organizational Storage Building
+ Waste Oil Storage Tank(s)
+ Waste Engine Coolant (Antifreeze) Storage Tank(s)
+ UAV Maintenance and Storage Building.



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2012 Tactical Equipment Maintenance (TEMF) "M1" Study

HQDA Requirements

- Meets Secretariat direction on facility reuse/repurpose w/o MILCON
- Brigade Centric focus
- G-3/5/7 adds deployment staging/prep ET/DT, and mission planning/rehearsal requirements
- Meets 2 Level Maintenance; enables CBM+
- Meets DISCOM/COSCOM dis-establishment (movement control & materiel management)
- Provides/enables embedded/distributed training (ET/DT)
- Supports all modernized systems
- Addresses maintainer/repairer MOSC Consolidation
- Facilitates RESET by AMC or National Maintenance Program with 35T crane in BSB
- Increases maintenance & repair thru-put by ~150-175% (dependent on TEMF std size)
- Reduces permutations of TEMFs from 246 to 4 (small, medium, large, x-large)
- Consolidated shop reduces footprint
- Reduces installation "green ramp" size, thru-put, and cost

2008 TEMF Army Standard

- Reviewed and approved by 2LM ICT
- Reviewed and approved by Maintenance Transformation ICT
- Review & concurrence by PEO GCS, Soldier, and FCS
- Review & concurrence by CASCOM; Ordnance Center & School; Quartermaster Center & School
- Review and support by 5 materiel PMs (Soldier Systems, Tank, Bradley, FTTS, Robotics/sensors)





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2011 Tactical Equipment Maintenance (TEMF) "M1" Study (cont'd)

HQDA Requirements	2008 TEMF Army Standard
<ul style="list-style-type: none"> • Increased electronics shops/van space by consolidation of technology (communications, robotics, sensors) maintenance/repair in TEMF • Dis-establishment of DISCOM/ COSCOM increased BSB TEMF requirements (e.g., added AMC BLST, materiel management & movement control manning, added capabilities (e.g., Medium Truck & DISTRO CO), and QA/QC functions • Increased TEMF footprint to support fielding modularized tool set (SATS) and Class IX (ASLMS) vans • Increased TEMF space to support consolidation and increased G-3/5/7 & TRADOC training (ET/DT, Classroom XXI, training network node) and mission (mission planning/rehearsal) requirements/ capabilities 	<ul style="list-style-type: none"> • Reduction in overall Army TEMF real property inventory is achieved with the current Army Standard (Bn TEMFs) • Aggressive implementation of the proposed G4 investment/buy-out strategy will reduce Army annual S/RM capital outlay substantially • Strategy components are in compliance with HQDA guidance and staffing decisions to enable 1st class support to current and emerging operations • 2LM/CBM+ doctrine implementation plans support the reduction of S/RM capital outlay while maintaining 21st Century logistics support • All spaces within the TEMF are required to meet all doctrine and directed (ARSTAF) requirements to comply with statute as "complete and usable"





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TEMF Facility Investment – Keep, Fix, Build, Dispose

☆☆☆ (DCS G-4)

TEMF Complex
Programmatic
Investment
Strategy

(Proposed)

“TEMF requirements & criteria don't change until I review and approve them”

LTG Stevenson
DCS, G-4

MCA-SR/M Bridge:

- Buy-out 634 CO TEMFs to Sml Bn TEMFs (~15 yrs @ \$58M/yr)
- Buy-out 194 former DS TEMFs to 130 TEMFs (~ 10 yrs @ \$205M/yr)
- Buy-out 197 GS TEMFs to 7 tactical GS TEMFs; AMC/DOL reqmn'ts (~4 yrs @ \$25M/yr)

MILCON Strategy:

- Construct BSB/FSB TEMF to support RESET (Return-to-Service)
- Construct largest Battalion TEMF for 1st level Field Maintenance thru-put
- Construct Sustainment Maintenance Company TEMF for RESET (Return-to-Supply)

FMC = Fully Mission Capable
CBM = Condition Based Maintenance
2LM = 2-level Maintenance
ET/DT = Embedded/Distributed Training
FFR = Force Feasibility Review

S/RM Strategy:

- Construct specialized non-sensitive and COMMS storage space for FFR 5.2 & 5.3 implementation within TEMF displacing supply storage space
- Provide ARMAG capabilities within TEMF to support FFR 5.1 storage requirements
- Provide largest lift capacity without MCA in BSB/FSB TEMF to support RESET
- Provide CL IX storage space with external storage building
- Provide IT/training capabilities to support ET/DT connectivity

TEMF Bn Set Posture:

- Average of TEMFs worldwide is **31** yrs old
- ~220* Bn TEMFs (pre-1986) in critical (RED) condition
- ~77* Bn TEMFs (1996 Std) partially FMC (AMBER)
- 113 or 22% of TEMFs standardized to 2LM/CBM FMC capability (GREEN)

* Requires IMCOM Verification

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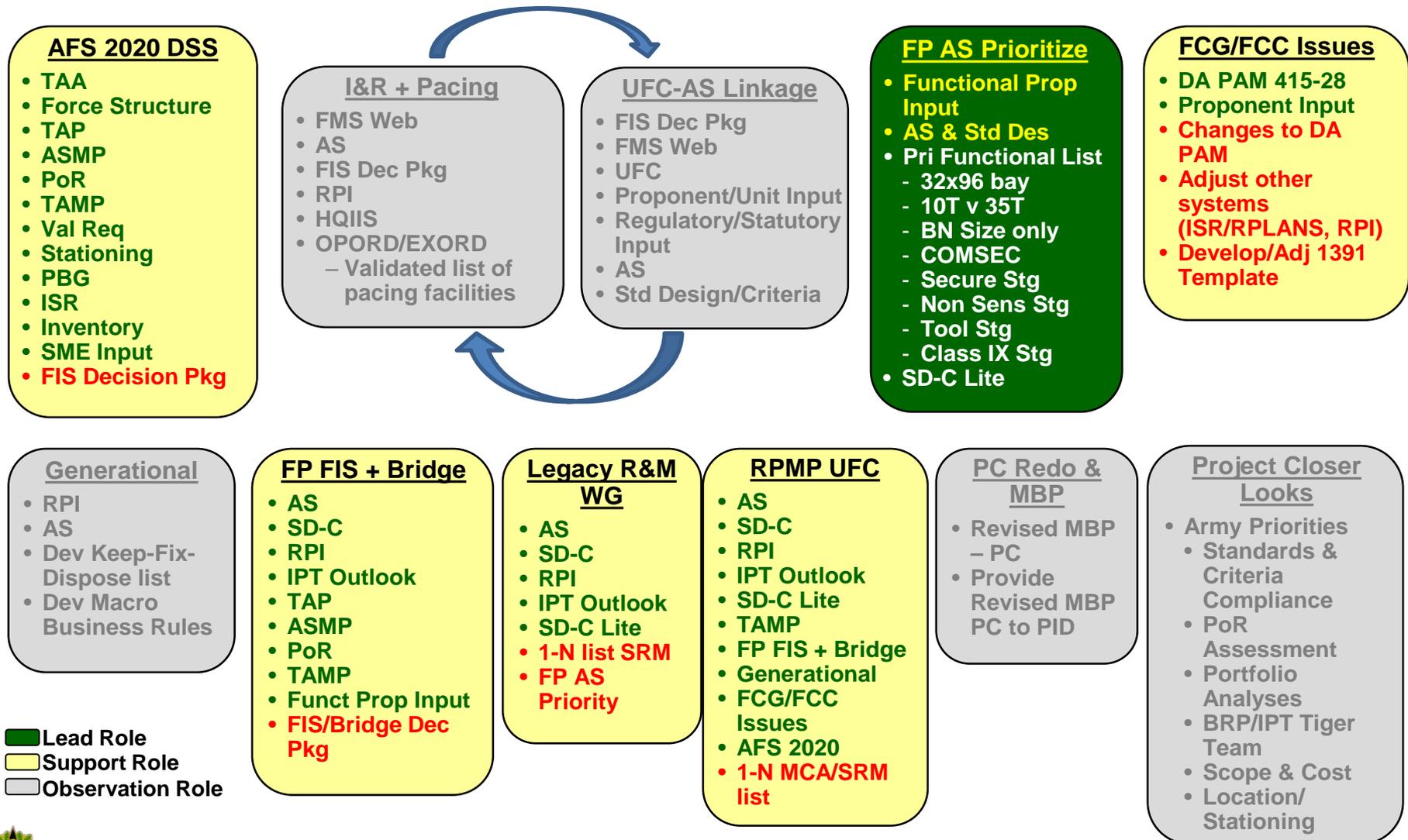


“Devil’s in the Details”



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Where are there common datum points that can be shared between initiatives?



"Decision Islands"



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What initiatives support others that can be mapped (prioritized in decision sequence) into a decision support process vice "decision islands"?

How can each initiative be cascaded into a battle rhythm end-to-end (output-to-input)?

How will emerging initiatives affect the outcomes of the AFS 2020 and FIS?

What, if anything, can we do to shape and streamline this effort?

AFS 2020
DSS

I&R +
Pacing

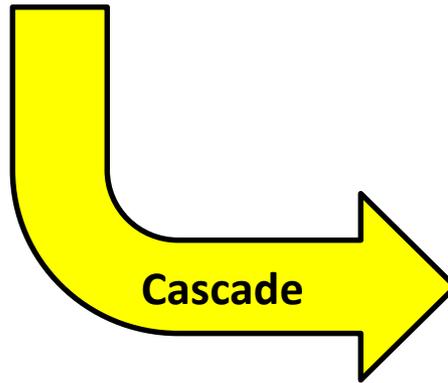
UFC-AS
Linkage

FP AS
Prioritize

FCG/FCC
Issues

Project
Closer
Looks

Generational



Critical External Enablers

FCG/FCC Reconciliation
process

RPMP needs to have
consequences



Portfolio

Scope & \$\$\$

Project
Closer
Looks

FP FIS +
Bridge

Project
Closer
Looks

Legacy
R&M WG

RPMP
UFC

PC Redo
& MBP

Project
Closer
Looks

