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Maintenance

**TWO LEVEL MAINTENANCE AND REGIONAL  
REPAIR OF AIR FORCE WEAPON SYSTEMS  
AND EQUIPMENT**

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This instruction implements AFD 20-3, *Air Force Weapon System Repairable Asset Management*. It is the basic definition and guidance of Two Level Maintenance (2LM) for current and future Air Force Weapon systems and equipment. This instruction applies to all Air Force active duty, Air National Guard (ANG) and Air Force Reserve Command (HQ AFRC) organizations, managing and/or performing maintenance activities. Waiver authority for this instruction is HQ USAF/ILM. MAJCOMs supplementing this instruction must coordinate their supplements with HQ USAF/ILM. This is a new instruction and does not replace an earlier instruction.

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## Chapter 1

### GENERAL GUIDANCE

**1.1. Maintenance Concept.** The overall mission of Air Force maintenance is to provide aerospace systems ready to fly and fight, and to sustain mission-ready equipment at the time and place it is needed. Maintenance tasks are divided into two categories, on-equipment (maintenance performed directly on the aerospace vehicle or support equipment) and off-equipment maintenance (maintenance performed to removed component parts of the aerospace vehicle or support equipment). In turn, these categories may be preventive or corrective in nature, and may be performed at the wing, regional, and depot level. Most Air Force weapon systems are currently repaired at three levels: organizational (on-equipment), intermediate (off-equipment), and depot. Each level indicates the type of repair to be performed from simplest to most difficult. Organizational is the simplest and consists of minor repairs, cannot duplicate testing (CND), and calibration. Intermediate repair is primarily testing and replacement of component parts. Depot level are those repairs that could not be accomplished at the intermediate level and major overhauls.

The Air Force however, is shifting its maintenance philosophy, procedures, and organization to accommodate a two level maintenance (2LM) approach. Changing to a 2LM concept by modifying and/or eliminating the intermediate (off-equipment) function where possible; and where possible, consolidating that repair function at a depot or regional level, successfully supports the Air Force objectives of reducing manpower, equipment, facilities, and mobility footprint while still meeting its Global Engagement mission objectives. The Air Force adopted the 2LM concept for new and upcoming weapon systems, and to the extent practical for existing weapon systems. Using state-of-the-art communications, item visibility, and fast transportation systems, unserviceable parts will be moved rapidly to and through the regional, depot, or contractor repair processes. 2LM will be performed at the appropriate organic Air Force regional, depot and/or contractor repair activity.

A regional repair center concept embodying Air Force and DOD doctrine can also provide lowered cost per flying hour maintenance and reduce manning requirements accordingly. A regional repair center is a hybrid of 3LM and 2LM and combines intermediate level maintenance from multiple bases to one location. Therefore, to the effected bases, the unserviceable assets are treated as 2LM and shipped to the regional repair center. The regional repair center performs the traditional intermediate level maintenance and the depot still performs the same type of repairs under the 3LM concept. This regional repair center concept should be applied where it makes good economic sense, as it offers similar advantages to that of 2LM. Some of these advantages are:

- 1.1.1. Consolidates like-maintenance efforts.
- 1.1.2. Affords a mobility/surge option.
- 1.1.3. Provides a second source and/or multiple sources of repair.
- 1.1.4. Provides a source of experienced personnel.
- 1.1.5. Allows for increased repair flexibility while maintaining lower overall repair costs due to economies of scale.

**1.2. General Guidance.** This section describes the various organizational responsibilities for managing the 2LM program. All requests for policy/procedural changes and waivers to this AFI will be submitted

by the MAJCOM/ANG/FOA to HQ USAF/ILMM for HQ USAF/ILM approval and/or disapproval. All approved changes will be coordinated through the appropriate HQ USAF/IL Directorates.

### **1.2.1. HQ USAF/ILM Responsibilities.**

1.2.1.1. The Air Force focal point for overall Air Force 2LM policy and guidance issues.

Establishes and approves procedures, changes, and waivers for all 2LM policy.

1.2.1.2. Develop Air Force automated measurements and/or standards of performance data that reflect the current 2LM performance of weapon systems and it included, support equipment items and/or components.

### **1.2.2. MAJCOM/ANG/FOA Responsibilities.**

1.2.2.1. Designate focal points to work organizational, functional, and technical issues pertaining to their respective 2LM programs.

1.2.2.2. Develop respective automated measurements and/or standards of performance data that reflect the current 2LM performance of their weapons systems and if included, support equipment items and/or components, as required.

1.2.2.3. HQ AFMC/LG, in conjunction with the Air Force Air Logistics Centers, contractor repair activities, and customers will: develop, collect, track, and/or analyze Air Force 2LM data using the appropriate metrics. The AFMC/LG will have available these metrics for the respective customers and/or HQ USAF, as required.

1.2.2.4. HQ AFMC/LG will maintain current criteria for analyzing candidate items for conversion from 3LM to 2LM or from 2LM to 3LM.

1.2.2.5. All requests for a Second Source of Repair will be forwarded to AFMC/LGP for AFMC/LG approval/disapproval.

### **1.2.3. Single Manager Responsibilities.**

1.2.3.1. Identify candidates for possible 2LM conversion. (See Chapter 5 for additional responsibilities)

### **1.2.4. Customer Responsibilities.**

1.2.4.1. By Mission Design Series (MDS), designate a focal point for functional, technical, and quality assurance matters relating to 2LM items.

**1.3. Metrics.** The successful implementation of 2LM principles relies upon the ability to accurately measure and evaluate logistics actions throughout the repair pipeline. Metrics are required to gauge weapon system performance under 2LM and evaluate effectiveness of depot and base support. These indicators will provide 2LM information to key decision makers. They will be capable of supporting changes in operating behavior and environments. They can serve as a diagnostic tool, and can be used individually or jointly to aid management decision-making.

**1.3.1. Purpose of 2LM Metrics.** To provide specific levels of management with information that will identify problems, suggest solutions, establish benchmarks, lead to changes in 2LM maintenance behavior, and establish correct goals and incentives at all levels of 2LM operations. Some metrics will

be established for use solely at the MAJCOM/ANG/FOA level or higher; others will include more detailed indicators of performances and/or will be more diagnostic in design to help resolve problems.

1.3.1.1. Defining the proper metrics that support 2LM maintenance is a key issue in the overall Air Force Logistics concept. It is imperative that all those involved in the implementation and management of 2LM, focus on a standard set of terms, definitions, and metrics for measurement and evaluation purposes. Metrics are divided into the following categories:

1.3.1.1.1. Maintenance

1.3.1.1.2. Supply

1.3.1.1.3. Transportation

1.3.1.1.4. Depot (regional and/or contractor repair facilities)

## Chapter 2

### TWO LEVEL MAINTENANCE CONVERSION GUIDANCE

**2.1. General.** Requests for policy, procedural changes and waivers to this AFI will be submitted through the MAJCOM headquarters organizations, to HQ USAF/ILMM for HQ USAF/ILM approval and/or disapproval. It is the users' responsibility, per T.O. 00-25-195, to detect opportunities for improved source, maintenance, and recoverability (SMR) codes. Requests for code changes will be IAW T.O. 00-25-195.

**2.2. Decision Processes.** The selection of a 2LM item is a detailed and deliberate process involving a series of decision steps. These steps each include a set of criteria which key decision makers and managers can use in evaluating items for inclusion into the 2LM process and/or removal from 2LM back to 3LM. The action to transfer an item into or out of 2LM must be a joint decision of the MAJCOM/ANG/FOA, Item Manager and any potential customers. The decision begins as a broad base filter and as each step or filter is applied, the criteria becomes more stringent. The first step provides three sorting techniques to begin the overall analysis of assets for possible transition to 2LM. The sorting techniques focus on combat readiness as the primary criteria, potential savings associated with eliminating manpower tied to intermediate level repair and avoiding the cost of buying high acquisition cost items. Cost savings must take into account residual tasks that must remain at the unit, i.e. F-16 CND screening/quick repair. 2LM candidates should be highly reliable, have a low demand on supply, have sufficient spares, and be easy to transport. Single Managers will identify items that have these characteristics. An example would be aircraft avionics as these items are generally small, and many are highly reliable. Periodic review processes will ensure that both unmodified and modified and/or redesigned items are evaluated using this first step in the conversion criteria. The second step will involve more detailed analysis using specially developed metrics. An automated matrix will allow for further analysis of potential NSNs, by comparing them against various logistics indicators such as Mean Time Between Failures (MTBF) and CND rates. The third step will involve evaluating the 2LM candidate list in terms of cost to transition to a different repair level, potential reduction in mobility footprint, and impacts to operational capability. The final step requires the Single Managers to run a checklist of repair environment and funding factors against the National Stock Numbers (NSNs) they are still considering for 2LM. This AFI will not cover the specific 2LM conversion criteria. The 2LM conversion criteria incorporating the various decision steps can be found in Air Force Handbook (AFH) 21-130, *Technical Analysis to Determine Criterion for Two Versus Three Level Repair*.

**2.2.1. Common Items.** If an item is used on more than one weapon system and has been identified by a Single Manager as a 2LM candidate, the policy is it should be 2LM for all weapon systems. However, the decision to make it 2LM across the Air Force should be based on what is in the best interest of all weapon systems. The initiating Single Manager will coordinate with the other effected Single Managers and the effected Single Managers should apply the criteria listed in AFH 21-130. The action to make an item 2LM common across multiple weapon systems must be a joint decision of the Single Managers, MAJCOM/ANG/FOA, Item Manager and any potential customers. An annual aggregate Two-Level Coordination and Activation Process (TCAP) meeting is the recommended forum to do this. If the joint decision is to "not" make the item common, the initiating Single Manager can still gain approval for the item to be 2LM on the single weapon system but the item will "not" be coded as 2LM in the Air Force supply system.

**2.3. Responsibilities.** The intended user of this 2LM Conversion Criteria AFH will be the various single managers and senior logistics representatives from the appropriate MAJCOMs/ANG/FOA.

**2.4. Applications.** The 2LM Conversion Criteria can be applied to most items in order to enter as many items into the 2LM process as practical. In addition, this criteria will be implemented when significant change and/or changes occur in an item's reliability, supply availability, or transportation requirements.

## Chapter 3

### MOVEMENT OF REPARABLES

**3.1. General.** 2LM must concentrate on continual improvement of the unit's mission capability by integrating and using the best business practices and logistics concepts. The main objective of Air Force Logistics is to maximize operational capability by using high velocity, time-definite processes to manage mission and maintenance uncertainty. This, in-turn, gives the Air Force shorter repair and delivery times, reduced inventories and associated costs, and a smaller mobility footprint. To improve the operations of the reparable and/or serviceable pipeline, Air Force 2LM operations will use:

- 3.1.1. Fast, time-definite delivery transportation to and from the depot or other source of repair.
- 3.1.2. Expedited DLA processing of reparables to the appropriate depot repair shop, non-batch repair processes, and the use of express transportation to return serviceable assets to the wing/installation or deployed location.
- 3.1.3. Expedited evacuation of reparables by the base to the appropriate depot.

**3.2. Retrograde Movement Standards and Goals.** All 2LM coded LRUs are to be evacuated off the base/installation within a standard time of two working days/48 hours. The start clock is when Base Supply issues a replacement LRU to the requesting maintenance activity or the maintenance activity removes the 2LM LRU off the weapon system, whichever occurs first. The stop clock is when the carrier picks up the 2LM LRU. If a unit is deployed and transportation channels exist, the unit will make every effort to meet the two workday/ 48 hour standard. Customers will use either standard depending on their current automated information system ability/capability to measure evacuation times.

- 3.2.1. Automated systems will be used to the maximum extent possible to command, control, communicate, track, and monitor the movement of reparables and/or serviceable 2LM items through the needed repair actions, to include transportation and supply.
- 3.2.2. Base Installation - Maintenance, Supply, and Transportation functions will develop coordinated processes, to include cut-off times, to facilitate evacuation of the reparable from the base/installation.
- 3.2.3. HQ AFMC will ensure that all depots and related like facilities:
  - 3.2.3.1. Repair on demand all 2LM reparable items required by the customer. 2LM coded items will not be batch-processed at the source of repair. If repair of items are being accomplished at a regional MAJCOM/ANG/FOA owned facility, the owning organization will ensure that all 2LM reparable items are repaired IAW this AFI.
  - 3.2.3.2. Determine the required bit and piece requirements needed to fully implement 2LM.
  - 3.2.3.3. Institute streamlined repair processes for contractor repair operations and meet similar repair times as organic Air Force repair operations.
  - 3.2.3.4. Use item/asset pipeline visibility tools at all organic and contract repair activities to monitor the logistics pipeline flow.
  - 3.2.3.5. Develop processes to ensure all reparable items are reviewed for 2LM applicability.

3.2.3.6. In conjunction with the Single Managers, and respective MAJCOMs/ANG/FOA, will ensure that items identified as 2LM are updated in the Stock Number Users Directory (SNUD) and Federal Logistics Data (FED LOG) system.

3.2.3.7. Have a surge plan for 2LM items.

## Chapter 4

### MAINTENANCE, SUPPLY AND TRANSPORTATION PROCESSING

**4.1. General.** There are several Air Force Logistics concepts and strategies upon which 2LM depends. Their main purpose is to develop and improve the pipeline processes, causing less reliance on inventories, ensuring a sufficient flow of items to and from units/installations, and deployed units. These concepts are:

- 4.1.1. High Speed Processes
- 4.1.2. Right-Sized Inventories
- 4.1.3. Asset/Item Visibility Tools

Wing/installations will support the concept of high-speed processes to ensure an uninterrupted flow of items through the logistics pipeline. The support concept for inventories will have the appropriate amount of inventory supporting the wing/installation, based on Readiness Based Leveling (RBL) computations. Wings/installations will acquire and use asset/item visibility tools. Managers will oversee the logistics pipeline, to ensure that the flow of assets through the system is not constrained, thus threatening combat capability. Managers must improve and update business practices, policies, management structures, and information systems to achieve more efficient, effective, logistics systems. This will allow better decision making about possible re-allocation of items and/or focus management attention on areas within the pipeline that are not performing as desired.

#### **4.2. Maintenance Processing.**

4.2.1. Once Base Supply issues a replacement 2LM LRU or the 2LM LRU item is removed from the weapon system (which ever occurs first), 2LM repairable items must be processed and either installed back on the aircraft or turned into Base Supply (serviceable or unserviceable) within one workday/24 hours. Base maintenance activities are authorized to do Cannot Duplicate (CND) screening and minor (quick) repairs only as long as it can be accomplished within one workday/24 hours and does not sub-optimize overall base repair capability. The one workday/24 hour standard includes any time spent in non-chargeable Due-In-From-Maintenance (DIFM) status codes (i.e., AWP, DWP).

#### **4.3. Supply Processing.**

4.3.1. HQ AFMC/LG will ensure that all 2LM NSNs (addition/deletions) are pushed to the bases via SNUD as changes occur. Base supply personnel are responsible to process these SNUD inputs and ensure appropriate codes are loaded in SBSS. Although this process is automated, there are instances when the proper codes will not be loaded unless supply personnel manually load them; i.e. MICAP/off-line requisitions, post-post processing, and new NSN loads. MAJCOM/ANG/FOA LGSs will implement training and procedural guidance to ensure their personnel process these requisitions properly.

4.3.2. MAJCOM/ANG/FOA will ensure SBSS records are modified to preclude requisitioning of SRUs indentured to 2LM LRUs and excess SRUs are identified for disposition by the Item Manager. HQ AFMC/LG and the Single Managers will develop a process to identify and update this SRU list for MAJCOM/ANG/FOA validation processing.

4.3.3. 2LM reparable items must be processed through Supply and Transportation within one working day/24 hours (from NRTS turn-in to carrier pick-up). Wings/installations will implement streamlined processes that assure this time frame is met.

4.3.4. 2LM requisition procedures are identified in AFMAN 23-110, Volume 2, Part Two.

#### **4.4. Transportation Processing.**

4.4.1. Traffic managers must ensure that reparable 2LM items are evacuated as quickly as possible for shipment to repair activities. Shipment planners must make every effort to ship those assets the same day they are received from Supply or Maintenance organizations. Enroute transportation activities will expedite movement of 2LM reparable items to minimize delays. Receipting transportation activities will also ensure that 2LM items are quickly processed and transferred to Supply or Maintenance activities.

4.4.2. Transportation organizations will ensure that 2LM items are moved using fast, time-definite best value transportation, including both Air Mobility Command (AMC) and commercial express door-to-door service. Delivery performance, speed, flexibility and consistency, will be the top criteria in selecting among defense transportation system carriers.

4.4.3. All organizations will reuse serviceable shipping containers to help expedite shipment of 2LM reparable items to and from the organization and source of repair.

## Chapter 5

### TWO LEVEL MAINTENANCE ANNUAL REVIEW OF WEAPON SYSTEMS AND SUPPORT EQUIPMENT

**5.1. General.** The evolving environment in Air Force Logistics has resulted in many changes in the way the Air Force thinks about, and performs, maintenance. Critical to meeting many maintenance requirements will be accurately forecasting 2LM actions for the DOD Future Year Defense Plan (FYDP). These fiscal requirements, will in turn, enable the Air Force to achieve the goals of the DOD Logistics Strategic Plan, partially by, reducing the costs and mobility footprint associated with maintenance. The result will be the best peace and wartime logistics profile that optimizes future Air Force roles and missions. Therefore, HQ AFMC, along with the Air Force Single Managers, and with the respective MAJCOM/ANG/FOA logistics representatives, will:

- 5.1.1. Meet at least annually (more often if needed) to review potential 3LM items for inclusion into 2LM.
- 5.1.2. Identify any 2LM candidates that should be returned to 3LM.
- 5.1.3. Ensure that the respective organizational Unit Type Codes (UTCs) are tailored to reflect the 2LM manpower and equipment changes.
- 5.1.4. Ensure that any changes to either 2LM or 3LM items are identified to the appropriate MAJCOM/ANG/FOA Comptroller organization, so they are included in estimated fiscal impacts.
- 5.1.5. Ensure that MRSP/IRSP and other spares packages are modified to represent the proper deployable maintenance support tasking.

WILLIAM P. HALLIN, Lt General, USAF  
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**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION***Abbreviations and Acronyms*

**2LM**—Two Level Maintenance  
**3LM**—Three Level Maintenance  
**APOD**—Aerial Port of Debarkation  
**APOE**—Aerial Port of Embarkation  
**AWP**—Awaiting Parts  
**CANN rate**—Cannibalization rate  
**CND**—Cannot Duplicate  
**CSI**—Consolidated Serviceable Inventory  
**DIFM**—Due-In-From-Maintenance  
**DLA**—Defense Logistics Agency  
**DLR**—Depot Level Repairable  
**DRIVE**—Distribution and Repair in a Variable Environment  
**ESTS**—Electronic Systems Test Set  
**FED LOG**—Federal Logistics Data on Compact Disc  
**IAIS**—Improved Avionics Intermediate Shop  
**IRSP**—In-Place Readiness Spares Package  
**LRU**—Line Replaceable Unit  
**MAJCOM**—Major Command  
**MDR**—Materiel Deficiency Report  
**MICAP**—Mission Incapable Awaiting Parts  
**MRO**—Materiel Release Order  
**MRSP**—Mobility Readiness Spares Packages  
**MTBF**—Mean Time Between Failure  
**NRTS**—Not Repairable This Station  
**NSN**—National Stock Number  
**RBL**—Readiness Based Leveling  
**RRC**—Regional Repair Center  
**SBSS**—Standard Base Supply System (USAF)  
**SMR**—Source, Maintenance, and Recoverability Code

**SNUD**—Stock Number User Directory

**SRU**—Shop Replacement Unit

**TCAP**—Two-Level Coordination and Activation Process

### *Terms*

**Air Mobility Express (AMX)**—AMX is the Air Force's adaptation of commercial overnight delivery that consists of (1) express carrier's CONUS infrastructure, (2) AMC airlift (organic/CRAF), and (3) the theater distribution system for express shipments. CRAF carriers provide DOD not only the use of aircraft, but their integrated CONUS express infrastructure. Express carrier's distribution structure will be used to pick-up/deliver cargo to/from their hubs where the carrier's personnel will load, off-load, and service AMC airlift missions. AMC will provide daily round trip direct service between the express carriers CONUS hub(s) and the designated APODs in the theater of operations. The theater commander will establish a distribution system that provides next day delivery of critical cargo.

**Awaiting Parts (AWP)**—Elapsed time a repairable spends awaiting parts while in the repair cycle.

**Batch Processing**—The accumulation of assets to achieve economic process quantity inducted into maintenance.

**Express Transportation**—Express Transportation leverages the relatively low cost and high reliability of fast transportation against the high cost of maintaining large inventories of spare parts. Express Transportation will be used to speed the shipment and return of 2LM items.

**Mean Time Between Failures (MTBF)**—A measure of the average time between failures of weapon system and/or equipment item functions.

**Mobility Readiness Spares Packages (MRSP)**—An air transportable package of spares and repair parts required to sustain planned wartime or contingency operations of a weapon or support system for a specified period of time pending resupply.

**Order and Ship Time (O&ST)**—Represents the expected number of days between initiation of a requisition and receipt of the stock by the user.

**Retrograde**—Repairable carcasses returning to the depot from operation locations and units/installations.

**Single Managers**—Refers to a System Program Director (SPD) or Product Group Manager (PGM).