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Aircraft Armament Systems Journeyman

Volume 1. Administration, Management, and Publications

Air Force Career Development Academy

The Air University

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Material in this volume is reviewed annually for technical accuracy, adequacy, and currency. For SKT purposes the examinee should check the *Weighted Airman Promotion System Catalog* to determine the correct references to study.

THIS CAREER DEVELOPMENT COURSE (CDC) consists of three volumes. When you have completed this course, you will have covered administration, management, and publications in volume 1; safety and security in volume 2; and electronic principles, troubleshooting, and maintenance in volume 3.

After successfully completing this volume you should have a better knowledge of administrative procedures and management concepts as they apply to your career field. Additionally, maintenance data, material management, inspections, product deficiency reporting, and the Air Force technical order system are also covered.

Unit 1 acquaints you with the Air Force's career ladder progression specifics, the classification system, and a few of the career fields you may work alongside. Unit 2 covers the system needed to control work when maintenance is performed. Unit 3 covers the maintenance information system. It will help you become familiar with some of the systems the Air Force uses to collect and process maintenance information and the material deficiency reporting (MDR) system. Unit 4 helps to understand the objectives and breakdown of the maintenance and inspection system. Additionally, it reviews the Air Force technical order system to help you learn of the various types and contents of technical orders and how they are numbered.

A glossary of terms is included at the end of each volume for your use.

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This volume is valued at 12 hours and 4 points.

NOTE:

In this volume, the subject matter is divided into self-contained units. A unit menu begins each unit, identifying the lesson headings, numbers, and page location. After reading the unit menu page and unit introduction, study the section, answer the self-test questions, and compare your answers with those given at the end of the unit. Then complete the unit review exercises.

Page

Unit 1. 2W1 Career Field

AIRCRAFT ARMAMENT SYSTEM SPECIALIST, loader, weapons troop, load toad, and numerous other titles are assigned to the 2W1 career field. No matter how the term is used, they all refer to the Air Force specialty (AFS) that is directly responsible for the maintenance of aircraft weapons systems. This career development course (CDC) is another element of training to prepare you to serve in your AFS. While the previous training you received in residence at the technical training facility was on a specific aircraft, this CDC will broaden the scope of your training to include most aspects of the career field and your role within it. Your understanding will be needed for all future progression in the Air Force. The first section will acquaint you with the Air Force's (AF) career ladder progression specifics and will cover the classification system as well as a few other career fields with which you may work closely.

1–1. Career Field Requirements

Career ladder progression is the term used to describe the growth the Air Force expects of you. Knowing the career ladder progression process is very important to your AF career. You should always know exactly what the Air Force expects of you at any given point throughout your career and what you can do to progress at the optimum rate within your career field.

001. Progression in the 2W1X1 career field

The primary purpose of a career ladder is to establish minimum skill requirements for a specialty from the apprentice level through the superintendent level. The rungs of the ladder are keyed to skill levels from the 1-skill level through the 9-skill level (only odd numbers are used). Rank is matched to specific skill levels, but there is considerable overlap so you can work at one skill level while training for a higher one. You progress from the 3- to the 5-level, then from the 5- to the 7-level, and finally from the 7- to the 9-level.

Skill level and rank relationship

According to the Air Force Enlisted Classification Directory (AFECD) which contains all official specialty code descriptions, there is no description for the 1-skill level, hence the title of helper. This is an entry level (unskilled) limited to the grade of Airman. If you are at the semi-skilled 3-level, your title is aircraft armament system *apprentice*. When you are awarded your 5-level, your title is aircraft armament systems *journeyman*. There are no grade restrictions applicable to these levels of your Air Force specialty code (AFSC). The important thing to remember is as a nonprior-service active duty Airman, you cannot expect to make senior Airman until you have obtained your 5-skill level.

The next rung of the ladder is the advanced 7-skill level with the title of *craftsman*. Here, the grade spread is from staff sergeant through master sergeant. Finally, at the top rung of the ladder are the 9-level superintendents and managers with a grade of senior master sergeant or chief master sergeant.

Generally, at each rung of the ladder you must achieve two things: (1) demonstrate your ability to perform your duty tasks and (2) develop your knowledge about all tasks and duties to the skill level appropriate for that rung of the ladder. The two channels (performance and knowledge) are required for upgrade to the 5-skill level. Performance and knowledge make up what is called the dual-channel on-the-job training (OJT) concepts.

Qualification

The rule from Air Force Instruction (AFI) 36–2101, *Classifying Military Personnel (Officer and Enlisted),* for qualification is clearly defined. Qualifications include knowledge, education, experience, training, and other factors. These are defined as mandatory or desirable for each skill level. While no one person is likely to perform all functions of an AFS at any one time, individuals can be developed to perform all duties and responsibilities of the various duty positions within an AFS at different times throughout a career. When individuals meet all of the mandatory qualifications of the specialty and have shown skill level qualification in all tasks of the position in which assigned, they are considered qualified for award of the AFSC.

002. Training progression in the 2W1X1 career field

When you become a supervisor, you are going to want qualified and proficient technicians working for you. You do not want individuals who have not been trained sufficiently, cannot do the job, and then must be trained from the ground up in your shop. The Air Force is always concerned about the training it provides. For this reason, a training evaluation program was established.

Management of training

Most of your career in the Air Force will be spent in training. With all of this time spent on training, you should be aware of some of the documents used in the management of your training and how they are created. Your career field manager (CFM) and major command (MAJCOM) functional managers meet at Sheppard AFB, Texas to conduct a utilization and training workshop (U&TW) in order to develop a list of basic knowledge/skills required to perform the duties of a 2W1. The document created to track these tasks is known as the career field education and training plan (CFETP) and is located in the training business area (TBA), which can be accessed online through the AF Portal. We will cover both systems to ensure complete coverage of this subject.

Career field education and training plan

The CFETP is the primary document used to identify life cycle education and training requirements. It serves as a road map for your career progression and outlines requirements that must be satisfied at appropriate points throughout your career path. The CFETP also specifies the mandatory task qualifications required for skill level upgrade. The CFETP consists of two main parts that helps plan, conduct, evaluate, and document your training.

Part 1 provides information necessary for overall management of the 2W1 specialty. This section lists specialty descriptions, duties and responsibilities, and career field progression and skill level upgrade requirements.

Part 2 of the CFETP contains a comprehensive list of training courses and specialty training standards (STS) that support the 2W1 career field. The purpose of the STS as stated in ~~AFI 36–2201, *Air Force Training Program,*~~ is to describe an AFS in terms of tasks and knowledge you are expected to perform or know on the job. It also identifies the training provided for you to achieve the 3-, 5-, or 7-skill level. It further acts as a contract between the Air Education and Training Command (AETC) and the functional user to show which tasks of an AFSC are taught in formal schools and correspondence courses.

Training business area

TBA is a web-based application providing AF members with global, real-time visibility into the technical qualifications, certifications, and training status of weapons systems and support professionals AF-wide.

This application is designed to facilitate training management for personnel in maintenance-related career fields. TBA supports base, wing, and work center level training management activities by automating training management business processes previously performed using paper records and legacy systems. This system allows access to training records for you, your trainers, and your supervisor anywhere that has network access. The TBA system is *exclusively* paperless; there are no provisions for creating, accessing, or maintaining paper copies of records.

Training evaluation

The AF Training Evaluation Program evaluates the training received by graduates of formal courses—those announced in ~~AFI 36-2201, *Air Force Training Program*~~, and CDCs prepared by AETC.

The program provides feedback on the efficiency and effectiveness of training courses and how well the course graduates satisfy field performance requirements. The evaluation of this training includes the collection, analysis, and interpretation of the feedback information. The feedback information comes from both internal and external evaluation methods. Internal evaluation information is data obtained from within the training environment: in other words from the trainees while they are enrolled in a course. External evaluation information is data collected from outside the training environment to evaluate the training product in the operating environment. This data is usually obtained after the trainee has graduated and is collected and evaluated through a field evaluation program. Data from the field evaluation program is used to determine these concerns:

1. The ability of recent graduates to perform the assigned tasks at the level the training standard specified.
2. How much knowledge recent graduates retain.
3. The need to revise the approved training standard, formal courses, or CDCs to improve training effectiveness and make training responsive to the needs of the using commands.
4. The need for further evaluation of training problem areas identified through graduate evaluation.

Graduate evaluations are obtained from the field through field evaluation visits and questionnaires. On a field evaluation visit, someone from the training activity visits an organization where graduates of the course are assigned and obtains evaluation data from the graduate, his or her immediate supervisor, and others with knowledge of his or her job performance. The STS is the reference for evaluating the graduate's ability to perform the tasks for which he or she has been trained.

The information given on questionnaires also measures skills and proficiencies acquired in training programs. In the basic course, graduates' supervisors are sent questionnaires about the graduates' abilities. In advanced courses, the graduates themselves receive the questionnaires.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

001. Progression in the 2W1X1 career field

1. What is the relationship between the skill levels and rank spreads of the 2W1X1 ladder?

2. What are the two channels required for upgrade to the 5-skill level?

002. Training progression in the 2W1X1 career field

1. Where is the CFETP located, and how is it accessed?

2. How many parts does the CFETP have, and what are they?

3. What part of the TBA system provides for a paper backup to be saved for future use?

4. What is the purpose of the AF Training Evaluation Program?

5. How is external and internal graduate evaluation information obtained?

1–2. Weapons Specialties

Strictly speaking, the term “career field” covers the entire 2W Air Munitions and Aircraft Armament Systems career field, including its three subdivisions:

1. 2W0X1–Munitions Specialist.
2. 2W1X1–Aircraft Armament Systems Specialist.
3. 2W2X1–Nuclear Weapons Specialist.

003. Background and breakdown

As you may have noticed, the Air Force tends to have instructions for pretty much everything. The jobs members perform on a daily basis are no different. We start with an overview of the classification system and a background of the associated 2W fields.

Classifying military personnel

AFI 36–2101 establishes the occupational structure of the AF’s enlisted force. It is primarily used by personnel officials and agencies in classifying all enlisted AF members and determining requirements for career field progression.

According to AFI 36–2101, the AFSC is the basic grouping of positions requiring similar skills and qualifications. In turn, the AFS is grouped into career field ladders and career field subdivisions, to provide for career development in different aspects of a career field. An AFSC suffix, also referred to as a “shred” or “shred out,” may be added to the AFS to help identify a specialization in a specific type of equipment or function (fig. 1–1). Examine figure 1–1 for the breakdown of the 2W151 AFSC.

The 2W1 career field incorporates shred outs to specify training on specific aircraft. These shred outs (fig. 1–2) were used to identify the weapons systems (aircraft) you would be working on at your first duty assignment. This shred out is determined by the course you attended at the Aircraft Armament Systems Technical School. The shred out disappears from your AFSC when you attain your 5-level, as it is assumed that you have acquired sufficient skills and experience to assume any 2W1 related duties. You, as a 2W131, have progressed about one-fourth of your way up the career field ladder.

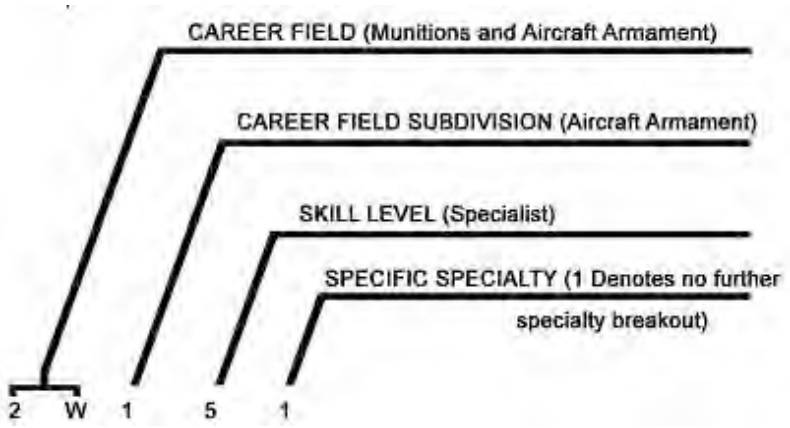


Figure 1–1. Breakdown of the 2W151 AFSC.

C	A–10
E	F–15
F	F–16
K	B–52
L	B–1
N	F–22
Z	Special Mission Aircraft

Figure 1–2. 2W131 Specialty shred out.

Other armament-related career fields

By now, you should be very familiar with the basic duties and responsibilities of the 2W1 career field. However, how much do you know about the other 2W career fields? It is critical you know what the other 2W career fields do because you will be interacting with members of these fields throughout your career. The following table lists their particular responsibilities.

Other Armament-related Career Fields		
Career field	**Specialty**	**Responsibilities**
2W0X1	Munitions Maintenance	• Identify, inspect, store, recondition, issue, deliver, maintain, and assemble conventional (nonnuclear) aerospace munitions. • Locally dispose of unserviceable or serviceable excess ammunition. • Store, handle, and transport nuclear weapons and nuclear weapons shapes. • Perform item accounting, inventory, stock control, requirement computation, determination of allowances, and research/identification of munitions supplies and equipment.
2W2X1	Nuclear Weapons	• Inspect, assemble, disassemble, and maintain nuclear weapons, reentry vehicle systems, launchers, pylons, bomb racks, penetration aids, and associated test and handling equipment. • Store and handle nuclear weapons and components. • Upload and download trailers used to transport nuclear weapons. • Perform weapons inventory, accountability, and verification procedures using special weapons inventory management system.

We have briefly discussed Airman classification and the associated 2W career fields. The purpose was to point out the scope of each subdivision so that you may understand each group's responsibilities. Subdivisions are clearly drawn, but do not be surprised to find each subdivision is involved with the others during daily routines to get an aircraft loaded and airborne.

004. Air Force specialty code skill levels

We've covered the broader 2W career fields, and now we're going to take a look at what a 2W1 actually does. The specialty descriptions are common between both the 3- and 5-skill levels. Knowing your duties and responsibilities not only enhances mission accomplishment but also gives you a better picture of what is expected of you now and what will be expected of you in the future.

2W1X1 skill levels

While you are a 3-level, you will be trained on a specific aircraft and will eventually receive a special experience identifier (SEI). This code identifies the aircraft you are trained to work on. SEIs differ from shred outs in two distinct ways:

1. A shred out is a limiting factor. In other words, it limits you to working on a specific piece of equipment for which you have received specialized training. While you possess a shred out, you are prevented from working on equipment identified by another identifier. The SEI identifies an area of experience or knowledge you possess and on which you have been trained.
2. You retain the SEI throughout your career in the Air Force while shred outs are lost upon completion of your 5-level training. You will gain other SEIs as you work on different aircraft and gain the additional training. The primary duties for a 2W131 are the same no matter the SEIs. These job descriptions can be changed to keep up with new equipment and operational situations.

Once you become a 5-level (journeyman), your duties change in scope. You still have to perform the duties of a 3-level in addition to your new 5-level duties. When you read the 7-level (craftsman) specialty description you will find the complexity of duties has increased. As a 5-level, you are expected to inspect, test, and repair weapons systems and equipment with minimal supervision as well as train newly assigned 3-levels. As a 7-level, you will be required to evaluate repairs performed by others and to establish workflow procedures. The description still includes the ability to do 5-level work.

Certain phases in the 2W191 (superintendent) specialty description point out an increased complexity of supervisory duties and responsibilities. For example, there are subduties not mentioned in the 7-level description, such as, plans, organizes, and directs; establishes and evaluates performance; ensures compliance; and analyzes. It should be obvious that a 9-skill-level technician is one who can anticipate all the needs of a section and take steps to provide for them.

2W1X1 duties

The following table lists the duties for each skill level for the 2W1 career field:

2W1X1 Duties	
Skill Level	**Duties**
2W131	• Loads, unloads, and positions munitions on aircraft. • Loads, positions, performs safing operations, and unloads munitions. • Uses handling, loading, and checkout procedures and equipment. • Tests suspension, launch, and release systems for retentive locking and manual or electrical release. • Analyzes malfunctions. • Performs functional checks of launch and suspension systems. • Prepares munitions and performs weapons postloading inspections. • Operates handling and loading equipment, and mates munitions with aircraft release, launch, and suspension systems.

2W1X1 Duties	
Skill Level	**Duties**
	• Loads and services aircraft gun systems. • Tests electrical and electronic circuitry for continuity, voltage, and proper operation. • Tests for unwanted electrical signal or power before connecting electrically actuated explosives and propellants. • Installs ground safety devices on munitions and gun system components to prevent inadvertent detonation, launching, or firing. • Inserts and removes impulse cartridges associated with fuel tanks and pylons. • Adjusts and installs fuses, boosters, and delay elements in conventional munitions.
2W151	• Inspects, repairs, and maintains aircraft release, launch, suspension, and monitor systems; aircraft guns; and related equipment. • Operates, inspects, and performs operator maintenance on related munitions handling, loading, and test equipment. • Examines for visual defects and proper installation of systems components, such as munitions ejector racks, loading and suspension devices, shackles, rocket pods, pylons, aircraft ammunition, boosters, and feed chutes. • Boresights and performs after-firing inspection of aircraft guns. • Examines aircraft guns for defects. • Analyzes malfunctions of munitions launch, release, suspension, monitor systems, and associated handling and loading equipment. • Disassembles, repairs, or replaces mechanical, electrical, electronic, and pneudraulic mechanisms of launch and release systems, and aircraft gun systems. • Removes, disassembles, and inspects parts and subassemblies for damage, rust, corrosion, or acceptable clearances and tolerances. • Makes adjustments and applies lubricants and preservatives. • Performs serviceability tests on aircraft guns, gun systems, and munitions associated suspension equipment.
2W171	• Performs armament systems maintenance functions. • Modifies munitions launch, release, suspension, and monitor systems to improve efficiency. Determines probable effect of modifications on future maintenance and operational problems.
2W191	• Plans, organizes, and directs aircraft armament systems maintenance activities. • Establishes and evaluates performance and training standards, maintenance controls, and procedures. • Checks methods and techniques used to load and unload munitions on aircraft, to repair and maintain aircraft release and gun systems, and to maintain, repair, and modify associated equipment. • Ensures compliance with policies, directives, and safety procedures. • Analyzes productivity and work quality. • Evaluates operational efficiency of aircraft guns and munitions systems, and recommends modification.

005. Munitions enterprise: conventional

Where the two previous lessons have laid out the particular duties of other 2W career fields, this lesson aims to show you how the career fields come together to meet the mission. To be truly successful as an aircraft armament technician, you need to have an understanding about the entire munitions process including the parts of the conventional munitions processes you may not have direct experience with at this time in your career.

Forecasting

The first step in the "munitions enterprise: conventional" process involves the forecasting of munitions. During the forecasting process, supervision in both the operations and maintenance sections are required to look forward (in some cases up to five years) to determine what their munitions requirements will be for training purposes. To develop their plan, they look at the operation plan (OPLAN) and the unit committed munitions list (UCML) or test/training munitions list (TTML). The OPLAN contains the missions and responsibilities the unit can be expected to perform during a contingency operation. The UCML/TTML lists all of the munitions the unit is expected to employ during its execution of the OPLAN. Once the unit determines its expected requirements for training munitions for the timeframe covered in its forecast, it submits the forecast to the MAJCOM for the next step in the process.

Allocation

The MAJCOM receives the completed forecast and determines the allocation for a given unit. The allocation is the actual number and types of munitions the Air Force is going to procure and provide to the unit to conduct its training missions.

Shipment and delivery

An approved allocation leads to a contract to purchase and deliver the munitions items to the location where they will be used. Generally, a civilian contractor moves the munitions from his or her storage or manufacture point to the unit by road or rail. In some rare cases, munitions items may also be moved by military air transport.

Acceptance and storage

Once the munitions items arrive at the munitions storage area (MSA), a.k.a. the bomb dump, a few processes happen at the same time.

The documentation paper trail starts at the accountability element of the MSA, sometimes referred to as AFK (munitions accounts element). The accounts section reviews the delivery paperwork and adds the munitions items to the MSA stockpile of items so they can be properly accounted for while being stored.

Physical control of the munitions items is taken by the "storage" element of the MSA. The storage element is responsible for safe long-term storage of all munitions items held in the MSA. They take the items to their storage location within the MSA and perform all required steps involved in safely storing the items until they are required for use, processing, assembly, inspection, or turn-in.

Particular munitions require an acceptance inspection. This is generally performed by the "inspection" element. This element specializes in inspecting and testing of most munitions items unless they fall under the category of precision-guided munitions (PGM). In this case, they are inspected by the PGM shop. The acceptance inspection consists of a set of parameters the munitions item or items must meet before they are accepted by the MSA for storage or use. The inspection and PGM elements are also responsible for periodic inspection of all munitions items stored in the MSA.

Scheduling

Once munitions are on hand and available for use, the time comes for the planning of their use. Operations develop a flying schedule with missions designed to use munitions. Once the schedule is complete, it is transferred to a written document called the *flying schedule*.

The proposed schedule is the subject of a meeting between the operations section and the maintenance section of the flying unit. During the meeting, details such as takeoff, landing, and turn times are discussed and reconciled. After an agreement is hammered out between ops and maintenance, the schedule is finalized and signed. Once a finalized schedule is produced, it is given to munitions control so munitions allocations can be verified and the preparation work on the required munitions work can be planned.

Breakout and build-up

After a schedule is finalized, a *frag order* is created. The frag order consists of the specifics of what munitions are required and when they are needed for loading. The frag order gets separated into work orders for the different shops contained within the MSA. Depending on the munitions required, conventional maintenance or PGM will have the storage element retrieve munitions items so they can assemble or configure them into complete rounds. As these munitions are prepared for use, they are entered into a computer tracking system called the Combat Ammunition System (CAS). After assembly, the CAS issues the munitions a number called a *complete rounds code*. This number identifies all the components used in the construction of a complete munition for field delivery. Once the munitions have been prepared for issue, they are positioned for the MSA shops.

Delivery

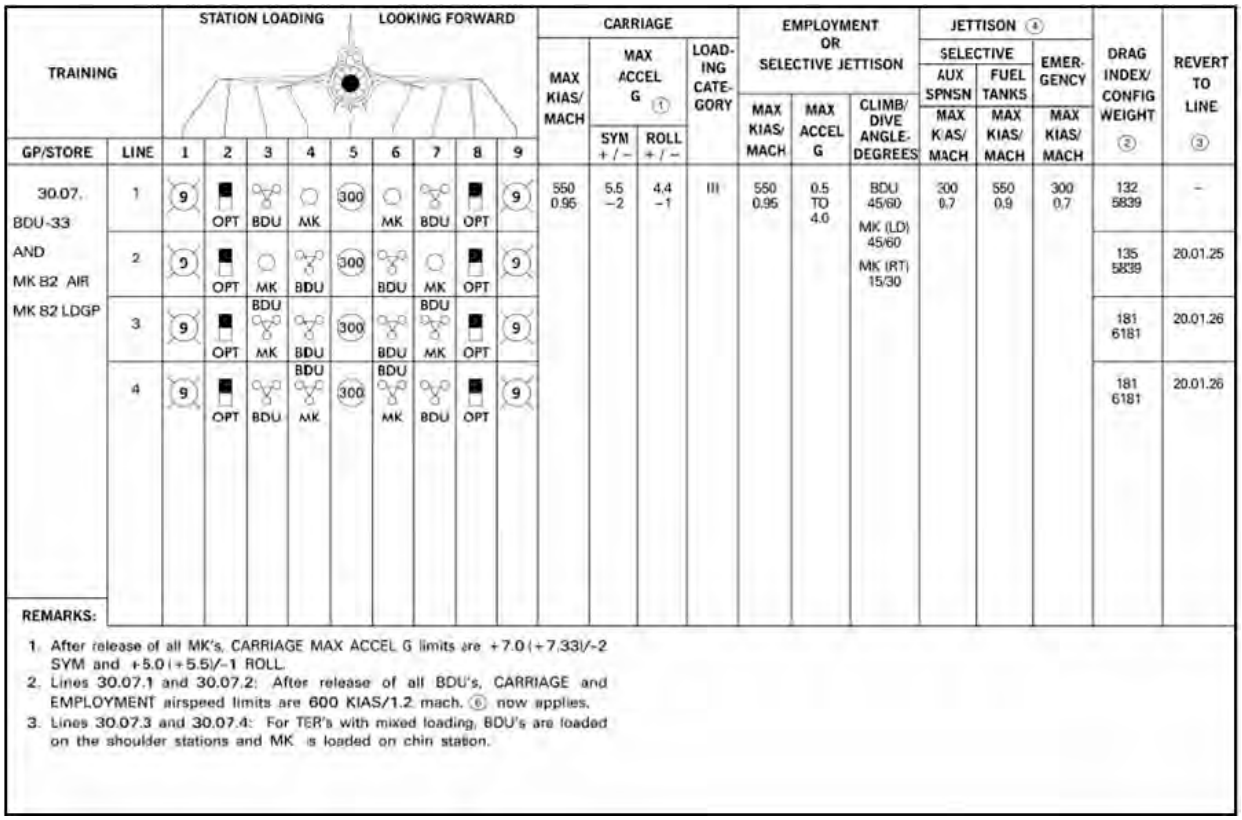
By now you should be pretty familiar with the line delivery part of the MSA. *Line delivery* is the element of the MSA involved with the movement of all munitions items outside of the MSA. *Munitions control* is the element of the MSA responsible for the coordination of all movements of munitions both within and outside the MSA; they prioritize and track the movements of all munitions. It's munitions control's job to make sure that everyone gets what they need, when they need it, while storage and line delivery get to do all of the heavy lifting involved in the movements.

Aircraft configuration

Aircraft configuration is important not only in your day-to-day training missions but the combat missions you might be tasked to load. How many times have you heard "Aircraft is not in –1 configuration" as a rejection during weapons load training?

All aircraft in our inventory have a flight manual that lists the flight characteristics, parameters of flight, limits of operation, and general operation procedures of these airframes. These manuals are commonly referred to as –1 flight manuals. You might find hard copies of these manuals in your support section or find the files on your respective ruggedized laptops or portable maintenance aids (PMA). As an aircraft armament technician, the section of particular importance to you is the section labeled "Operating Limitations." Under this section, there is a subsection showing munitions stores. Within the stores section of the –1, all approved and authorized air munitions (to include stores configuration) are provided in illustrated, easy-to-use tables. The reason this section is important to you is that if the configuration is not listed in this section, then the munition cannot be loaded on the aircraft.

In figure 1–3, you see an example of a table located in technical order (TO) 1F–16CG–1, *Flight Manual F–16 C/D*. This table lists all the approved configurations for the bomb dummy unit (BDU)-33 and the Mark (MK)-82. There are several reasons why we want our specific aircraft to be in compliance with the –1 and the most important reason is flight safety. Unauthorized configurations might have adverse drag effects on the aircraft, or it might be due to structural concerns. At some point, you will assist your team chief in reconfiguring aircraft in order to fix this type of issue. If the configuration is unfamiliar, you and your supervisor can refer to the stores limitation section of the –1 flight manual for your aircraft and verify the correct way to configure the aircraft. Regardless, it would be beneficial for you to become familiar with this section on your current aircraft.



TRAINING — STATION LOADING — LOOKING FORWARD

GP/STORE	LINE	1	2	3	4	5	6	7	8	9	CARRIAGE MAX KIAS/MACH	CARRIAGE MAX ACCEL G SYM +/− ①	CARRIAGE MAX ACCEL G ROLL +/− ①	CARRIAGE LOADING CATEGORY	EMPLOYMENT OR SELECTIVE JETTISON MAX KIAS/MACH	EMPLOYMENT OR SELECTIVE JETTISON MAX ACCEL G	EMPLOYMENT OR SELECTIVE JETTISON CLIMB/DIVE ANGLE-DEGREES	JETTISON ④ SELECTIVE AUX SPNSN MAX KIAS/MACH	JETTISON ④ SELECTIVE FUEL TANKS MAX KIAS/MACH	JETTISON ④ EMERGENCY MAX KIAS/MACH	DRAG INDEX/CONFIG WEIGHT ②	REVERT TO LINE ③
30.07. BDU-33 AND MK 82 AIR MK 82 LDGP	1	9	OPT	BDU	MK	300	MK	BDU	OPT	9	550 0.95	5.5 −2	4.4 −1	III	550 0.95	0.5 TO 4.0	BDU 45/60 MK (LD) 45/60 MK (RT) 15/30	300 0.7	550 0.9	300 0.7	132 5839	–
	2	9	OPT	MK	BDU	300	BDU	MK	OPT	9											135 5839	20.01.25
	3	9	OPT	BDU MK	BDU	300	BDU	BDU MK	OPT	9											181 6181	20.01.26
	4	9	OPT	BDU	BDU MK	300	BDU MK	BDU	OPT	9											181 6181	20.01.26

REMARKS:

1. After release of all MK's, CARRIAGE MAX ACCEL G limits are +7.0 (+7.33)/−2 SYM and +5.0 (+5.5)/−1 ROLL.
2. Lines 30.07.1 and 30.07.2: After release of all BDU's, CARRIAGE and EMPLOYMENT airspeed limits are 600 KIAS/1.2 mach. ⑥ now applies.
3. Lines 30.07.3 and 30.07.4: For TER's with mixed loading, BDU's are loaded on the shoulder stations and MK is loaded on chin station.

Figure 1–3. Configuration matrix.

Reconciliation process

The reconciliation process, or recon, is where the munitions asset tracking of the supported unit (the flight line) gets compared to the munitions asset tracking of the support unit (ammo). In short, the starting number of munitions needs to balance against the ending balance of munitions, plus expenditures for the day.

Munitions on hand at end of flying day + expenditures = starting number of munitions

If the numbers balance for both units (the flight line and ammo) during document review, a physical accounting and verification takes place by an ammo representative from either the accounts or line delivery section. Upon completion of the physical inventory, the recon process is completed. If both units agree that the munitions have been properly accounted for, then the expenditures will be processed for the day. If either too many or too few munitions are on hand according to the recon paperwork, then research must take place to determine where the discrepancies occurred. This research process can be very time-consuming for both units, resulting in delays for any movement of munitions between the units. All possible measures must be taken by *everyone* in the process to ensure proper accounting of munitions takes place at all times.

Once, and only once, the recon process is successfully completed, the movement of munitions can commence. Munitions no longer needed are returned to ammo and deliveries to the flight line for needed munitions starts.

Turn-in

Once munitions are no longer needed on the flight line, they need to be returned to ammo. Unneeded munitions items are a needless hazard to everyone working on the flight line, and their removal complies

with the cardinal rule of weapons safety: “Minimum amount of explosives, minimum amount of people, and minimum amount of time.”

The proper configuration of munitions trailers can be found in TO 11–1–38, *Positioning and Tie down Procedures Non-Nuclear Munitions*. This TO provides the proper configuration of munitions on trailers. Line delivery drivers are required to ensure the munitions are configured according to this instruction before towing any trailer. Strict following of this guidance by armament personnel allows the line delivery drivers to spend more time moving munitions instead of securing trailers for transport. Working with the drivers to make them more efficient in their job means faster, more timely delivery of your munitions so that you can do your job with fewer delays—a win-win situation for everyone.

If a munitions item is no longer required for flight-line support, it is returned to the MSA for processing. Usually this involves an inspection by the inspection section or PGM and either storage section if the item is stored in its current configuration or “torn down” to its components for storage.

006. Relationship to Air Force commands and missions

Now you have seen the 2W1X1 duties and should realize how each level differs. Let’s look at the various duties you will most likely perform in the different MAJCOMs.

MAJCOMs with the same types of aircraft

Air Combat Command (ACC), Pacific Air Forces (PACAF), AETC, Air National Guard (ANG), Unites States Air Force Reserve (USAFR) and United States Armed Forces in Europe (USAFE) use the same types of aircraft, and although their missions are different, the duties of 2W1s generally fall into three major categories: (1) weapons loading element, (2) weapons maintenance element, and (3) aircraft armament flight.

Weapons loading element

The weapons loading element is responsible for the loading and unloading of munitions on fighter, bomber, and attack aircraft in support of daily flying and contingencies missions. Personnel in this element also remove and install armament-related suspension equipment on assigned aircraft to support configuration requirements for daily flying and contingencies missions.

Weapons maintenance element

The weapons maintenance element installs and removes all armament-related equipment to facilitate other maintenance (FOM) or for repair action. In addition, this element performs aircraft troubleshooting and repair actions, performs aircraft armament systems functional checks, and on-equipment inspections on in-use equipment. Generally, these activities are described as “on-equipment” maintenance. This refers to maintenance done on the end-item, and in this case the end-item is the aircraft itself.

Aircraft armament flight

This flight normally performs off-equipment maintenance for assigned fighter, bomber, and attack aircraft armament system including guns, pylons, racks, launchers, and adapters. This maintenance includes performing scheduled inspections, modifications, and troubleshooting of this equipment.

Air Force Special Operations Command

Weapons personnel are assigned to the Weapons Flight/Section in Air Force Special Operations Command (AFSOC) as armament technicians servicing primarily search-and-rescue helicopters or aircraft and the AC–130 gunships. This section performs on- and off-equipment maintenance on alternate mission equipment (AME) and normally installed equipment (NIE) including weapons release systems, guns, racks, launchers, and adapters. Armament personnel also install and remove guns, load and unload ammunitions, troubleshoot malfunctions, and reconfigure aircraft.

Air Force Materiel Command

Air Force Materiel Command (AFMC) provides a very important function for all AF commands in the form of *depot maintenance*. These depots are primarily repair centers for specific weapons systems. It would be extremely expensive for the Air Force to provide every field unit with all of the equipment and facilities needed to repair and overhaul all of the components that make up a complete weapons system. Therefore, the depot system has been set up and certain components are designated for depot repair only. Personnel assigned to these depots perform necessary maintenance, overhaul, and return the components to the supply system for reissue to field units. Within this command, you may also have the interesting job of participating in the test and evaluation of new and prototype weapons and weapons systems. Your duties will include munitions loading for test and evaluation of the munitions, suspension equipment, and weapons system. You will be involved with both in-shop and on-equipment maintenance of the weapons system and with gun system maintenance.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

003. Background and breakdown

1. What type of information is found in AFI 36–2101?

2. What career field locally disposes of unserviceable excess ammunition?

3. What career field stores and handles nuclear weapons and components?

004. Air Force specialty code skill levels

1. What code identifies the aircraft you are trained to work on?

2. Identify the skill level or levels that each of these duties belong.

   (a) Boresights and performs after-firing inspection of aircraft guns and examines aircraft guns for defects.

   (b) Operates handling and loading equipment, and mates munitions with aircraft release, launch, and suspension systems.

   (c) Determines probable effect of modifications on future maintenance and operational problems.

   (d) Establishes and evaluates performance and training standards, maintenance controls, and procedures.

005. Munitions enterprise: conventional

1. What documents are used by the unit to determine their munitions forecast?

2. What does the complete rounds code identify?

3. Why is it of critical importance that both the flight line and ammo agree that the munitions have been properly accounted for at the end of the recon process?

4. What publication has the information on the proper configuration of munitions trailers?

006. Relationship to Air Force commands and missions

1. Match each major command in column B with its function in column A. Items in column B may be used once, more than once, or not at all.

Column A	*Column B*
____ (1) Loading munitions on fighter aircraft.	a. ACC.
____ (2) Loading munitions on bomber aircraft.	b. AETC.
____ (3) Installing ammunition on search-and-rescue helicopters.	c. AFMC.
____ (4) Loading missiles on fighter aircraft for test and evaluation missions.	d. AFRES.
____ (5) Performing depot-level maintenance of weapons system components.	e. AFSOC.
	f. ANG.
	g. PACAF.
	h. USAFE.

Answers to Self-Test Questions

001

1. A 1-level is unskilled and limited to the rank of Airman; a 3-level is apprentice; a 5-level is a journeyman. There are no grade restrictions applicable to these levels of your AFSC. A 7-level is a technician with the grade spread of staff sergeant through master sergeant; the 9-level is a superintendent with a grade spread of senior master sergeant through chief master sergeant.
2. Performance and knowledge.

002

1. It is located in the TBA and is accessed online through the AF Portal.
2. Two main parts. Part 1 provides information necessary for overall management of the 2W1 specialty. Part 2 contains a comprehensive list of training courses and STSs that support the 2W1 career field.
3. There are no provisions made for creating paper copies.
4. The program provides feedback on the efficiency and effectiveness of the training courses and how well the course graduates satisfy field performance requirements.
5. Internal information is obtained from the students enrolled in a course. External information is obtained from student graduates and others involved in training programs.

003

1. The occupational structure of the AF enlisted force.

2W0X1.
3. 2W2X1.

004

1. The SEI.
2. (a) 2W151.
   (b) 2W131.
   (c) 2W171.
   (d) 2W191.

005

1. The OPLAN and the UCML/TTML.
2. This number identifies all the components used in the construction of a complete munition for field delivery.
3. If either too many or too few munitions are on hand according to the recon paperwork, then research must take place to determine where the discrepancies occurred. This research process can be very time-consuming for both units resulting in delays for any movement of munitions between the units.
4. TO 11–1–38.

006

1. (1) a, b, d, f, g, h.
   (2) b, d, f, g, h.
   (3) e.
   (4) c.
   (5) c.

Complete the unit review exercises before going to the next unit.

Unit Review Exercises

Note to Student: Consider all choices carefully, select the *best* answer to each question, and *circle* the corresponding letter. When you have completed all unit review exercises, transfer your answers to the Field-Scoring Answer Sheet.

Do not return your answer sheet to the Air Force Career Development Academy (AFCDA).

1. (001) The title associated with a 2W131 is an aircraft armament
   a. helper.
   b. mechanic.
   c. apprentice.
   d. journeyman.

2. (001) What grade restrictions apply to the 3– and 5–skill levels?
   a. None.
   b. AB through A1C.
   c. AB through SRA.
   d. AMN through SRA.

3. (001) What are the grade restrictions that apply to the 7-skill level?
   a. SRA through SSgt.
   b. SSgt through TSgt.
   c. SSgt through MSgt.
   d. SSgt through SMSgt.

4. (002) Which major command (MAJCOM) representatives meet periodically with the Air Force career field manager to develop a list of the basic skills required to perform the duties of a 2W1?
   a. Functional managers.
   b. Wing weapons managers.
   c. Career development course authors.
   d. Weapons system career field managers.

5. (002) What is the primary document used to identify life cycle education and training requirements?
   a. Task analysis.
   b. Core task analysis.
   c. Career field task audit.
   d. Career field education and training plan.

6. (002) What is used as a paper back up to the training business area (TBA)?
   a. There are no paper forms of TBA.
   b. Air Force IMT Form 623a.
   c. Memorandums for record.
   d. Air Force Form 797.

7. (002) The Air Force Training Evaluation Program evaluates training received by graduates of
   a. formal courses.
   b. informal courses.
   c. on-the-job training.
   d. formal courses and on-the-job training.

8. (002) Which Air Force program provides feedback on the efficiency and effectiveness of the training courses?
   a. Training Evaluation Program.
   b. Test and Evaluation Program.
   c. Training Efficacy and Modernization Program.
   d. Training Course Evaluation and Standards Program.

9. (002) Where is internal information obtained from for the Air Force Training Evaluation Program?
   a. Supervisors who are assigned graduates.
   b. Flight chiefs who are assigned graduates.
   c. Trainees while they are enrolled in a course.
   d. Instructors while they are teaching a course.

10. (003) What is the basic grouping of positions requiring similar skills and qualifications?
    a. Air Force duty classification.
    b. Air Force specialty code (AFSC).
    c. Classification codes for enlisted personnel specialties.
    d. Classification of force education and training plan (CFETP).

11. (003) What may be added to Air Force specialties to identify a specialization in a specific type of equipment or functions?
    a. Air Force specialty code suffix.
    b. Numerical Air Force specialty codes.
    c. Alphabetical Air Force specialty codes.
    d. Alphabetical special experience identifiers.

12. (004) When is a special experience identifier (SEI) removed from your Air Force specialty code (AFSC)?
    a. After completing on-the-job training.
    b. After completing 5-level upgrade training.
    c. After completing 7-level upgrade training.
    d. They are retained throughout the duration of your career.

13. (004) Which skill level of technician is expected to anticipate all the needs of a section and take steps to provide for them?
    a. 2W131.
    b. 2W151.
    c. 2W171.
    d. 2W191.

14. (004) Which of the following is considered a duty of a 2W171 *only*?
    a. Examine system components for visual defects and proper installation.
    b. Modify munitions launch, release, suspension, and monitor systems to improve efficiency.
    c. Perform serviceability tests on aircraft guns, gun systems, and munitions associated suspension equipment.
    d. Disassemble, repair, or replace mechanical, electrical, electronic, and pneudraulic mechanisms of launch and release systems, and aircraft gun systems.

15. (005) The actual number and types of munitions the Air Force is going to procure and provide to a unit to conduct their training is the unit's
    a. expenditures.
    b. allocation.
    c. allotment.
    d. schedule.

16. (005) Which element in the munitions storage area is responsible for the coordination of all movements of munitions both within and outside the munitions storage area?
    a. Munitions control.
    b. Accountability.
    c. Line delivery.
    d. Storage.

17. (005) Which publication lists the characteristics, parameters, limits of operation, and general operation procedures of an airframe?
    a. –1 Flight Manual.
    b. –06 Work Unit Code Manual.
    c. –6 Inspection and Maintenance.
    d. 33–1–2, Nonnuclear Loading Procedures.

18. (006) In which command does 2W1 personnel service search and rescue helicopters?
    a. Air Force Space Command (AFSC).
    b. Air Force Material Command (AFMC).
    c. Air Force Reserve Command (AFRES).
    d. Air Force Special Operations Command (AFSOC).

Please read the unit menu for unit 2 and continue ➔

Student Notes

Unit 2. Maintenance Management

BACK IN THE GOOD 'OLE DAYS, as some of us remember, the supervisor would tell the mechanic to "go fix it," and the job would be done without paperwork, computer work, or detailed directives from a maintenance operation center (MOC). However, maintenance today is a complex business, and although there is some fuss about "paper empires," the paperwork and controls are necessary. On the surface, it may appear these things complicate the job and are time-consuming. But if you give this subject a little thought, it will become apparent how necessary it is. Obviously, today's equipment is so complicated and its maintenance is so specialized, all aspects must move with the precision of a fine watch. Thus, a system is needed for controlling work when maintenance is performed.

2–1. Organization and Functions of the Maintenance Management System

The mission of a military unit determines how the unit should be organized. Maintenance organizations vary because of location, size, and types of equipment, weapons systems, and so forth. This section will help you understand the management structure of a maintenance organization. We will also discuss how the various units of a maintenance organization interact with one another to keep your equipment and weapons systems operational.

007. Purpose and requirements of maintenance management

The purpose of a maintenance organization is to keep its equipment in serviceable status. In your case, you must maintain aircraft armament systems and associated equipment to be constantly ready for any contingency.

With a trip to any auto repair shop, you will immediately notice how complicated maintenance is on a simple automobile. You can easily imagine how much more complicated the modern combat aircraft is when compared to a car. The aircraft weapons systems and equipment of today are so complex and diverse they require many different specialists to maintain the system. Programming and directing these specialists to do their jobs correctly and at the right time, without interfering with each other, is a tremendous management challenge. The right people must be available to work and must be instructed as to what duties to perform. Work must be scheduled, and parts, tools, and support equipment must be on hand. Work must be inspected to ensure quality. There must be some method of reporting discovered deficiencies and documenting work performed. Managers must know what equipment is in service and what is in need of repair. Regularly scheduled inspections are necessary. Irregular, haphazard, or careless inspection and maintenance invariably results in the gradual deterioration of aircraft weapons systems and equipment.

The Air Force developed AFI 21–101, *Aircraft and Equipment Maintenance Management,* to preclude the loss of operating efficiency, to ensure maximum production in minimum time, and to obtain a complete picture of where and when difficulties occur in maintaining equipment. An effective maintenance management system must have three things: (1) a well-organized management structure, (2) latitude for MAJCOMs to tailor and streamline command management policy and procedures, and (3) an efficient method of reporting maintenance data. Keep in mind, however, the ultimate success of maintenance will always rest on the shoulders of a specialist like you. The quality

of aircraft weapons systems and associated equipment is only as good as the workmanship you put into them.

008. Maintenance system

The AF maintenance system ensures material is serviceable, safe to operate, and in the proper configuration to meet mission requirements. We accomplish this by performing maintenance including inspection, repair, overhaul, modification, servicing, testing, and analysis.

Maintenance concepts

According to Air Force Policy Directive (AFPD) 21–1, *Maintenance of Military Materiel*, it describes the maintenance concept as organizational, intermediate, and depot maintenance capabilities for operational readiness which shall be maintained to ensure effective and timely response to peacetime operations, mobilizations, national defense contingencies, and other emergencies. This concept can be broken down into three maintenance capabilities: organizational, intermediate, and depot.

Maintenance Concepts Capabilities	
Capability	**Responsibilities**
Organizational	Launch and recover sorties; maintain and repair material coded for organizational-level repair.
Intermediate	Repair material coded for organizational- and intermediate-level repair in back-shops and/or centralized repair facilities.
Depot	Repair material coded for organizational, intermediate, and depot; overhaul; rebuild; modify and manufacture.

Organizational and intermediate-level maintenance is organized into two mutually supporting networks: the mission generation network (MGN) and the repair network (RN). The MGN is optimized for mission generation at the wing level and consists of authorized “on-equipment” and “off-equipment” maintenance capabilities required to launch, recover, configure, inspect, and repair AF systems and equipment. The RN supports the MGN by providing maintenance required to fulfill operational needs outside the capability and/or capacity of MGN activities. The activities mentioned will be the maintenance tasks that you will be performing on a daily basis, regardless of where you are assigned.

As much as possible, maintenance tasks are accomplished on a preplanned or “scheduled” basis. This emphasis on planning is intended to get the work done in a timely manner with the most efficient use of personnel, facilities, and equipment. It allows an even, orderly flow of maintenance activity, with allowances for events or incidents not predicted or scheduled.

The Air Force strives to improve the capability of maintenance activities. Organizations achieve maintenance standardization in several ways. They train technicians to use standardized practices and strictly comply with technical data and publications. They also use highly qualified technicians to evaluate personnel and equipment. You are probably already quite familiar with these two aspects of the aircraft armament systems field.

Documentation of all activities is another concept of the maintenance system. Data is collected and recorded so the maintenance organizations can provide their managers with complete and accurate information. Management then uses this information for planning, controlling, and analyzing not only your weapon system but also future weapon systems. How many spare missile launcher power supplies would you contract the manufacturer to produce for the F–22? AF planners use your documentation data to answer questions like this one all the time.

Maintenance types

Three terms are frequently used to describe the types of maintenance—preventive, scheduled, and unscheduled.

Preventive maintenance

Aircraft require regular maintenance and repair to ensure their optimum availability for mission tasking. Each aircraft is designed with a maintenance concept tailored to its operational mission. Built into that concept are specific inspection and servicing requirements, which form the basis of a preventive maintenance program. By following that program, aircraft systems and components operate with greater reliability over time to ensure maximum aircraft availability. A conscientious and disciplined approach to preventive maintenance is the method used to meet that goal safely and effectively.

The purpose of the entire maintenance process is to sustain a capability to support the flying and training missions. To accomplish this objective, the primary focus should be on preventive, rather than corrective maintenance. Preventive (or scheduled) maintenance ensures equipment is ready and available at the time of need. On the other hand, corrective (or unscheduled) maintenance is generated during the process of using equipment.

Scheduled maintenance

Scheduled maintenance describes maintenance requirements planned or programmed for accomplishment on either a short-range or long-range schedule. This type of maintenance includes recurring scheduled inspections, servicing, compliance with time compliance technical orders (TCTO), time change requirements, and delayed or deferred discrepancies.

Unscheduled maintenance

Unscheduled maintenance refers to unpredictable maintenance requirements not previously planned or programmed. Maintenance of this type includes correction of discrepancies discovered during the operation or use of equipment, repairs necessary due to accidents or incidents, and compliance with immediate action TCTOs.

Maintenance categories

There are two maintenance categories—on-equipment and off-equipment. The “equipment” referred to is the end-item. According to TO 00–20–1, *Aerospace Equipment Maintenance Inspection, Documentation, Policies, and Procedures*, the term “end-item” refers to an entity of hardware which is not to be installed in another piece of equipment. For example, a breech assembly is installed into a bomb rack. The bomb rack is then installed into a pylon. The pylon is installed onto the aircraft. The aircraft is not installed into anything else; it is the end-item, as far as the vast majority of 2W1s are concerned. This does not mean that aircraft are the only end-items; each piece of aerospace ground equipment (AGE) is an end-item, each support vehicle, and so forth. The list is endless.

On-equipment maintenance refers to maintenance tasks that are on or can be effectively performed on or at the weapon system or end-item of equipment. This includes such tasks as servicing, loading, launching, and recovering aircraft; removing and replacing aircraft components; scheduled inspections, TCTOs, and other modifications done with skills and equipment possessed by the unit.

Off-equipment maintenance refers to tasks that are not or cannot be effectively accomplished on or at the weapons system or end-item of equipment but requires the removal of the component to a shop or facility for repair. This includes such tasks as repair of components by removing and replacing subassemblies or repairing the gun after an in-flight gun jam. For deployed or dispersed units during war, the tasks may be limited to such simple repairs as replacing grommets or firing pins. For units who will fight in place, however, this capability should be more highly developed.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

007. Purpose and requirements of maintenance management

1. Why did the Air Force develop AFI 21–101?

2. What three things are required to have an effective maintenance management system?

008. Maintenance system

1. What are the three maintenance concept capabilities?

2. List the ways an organization can standardize its maintenance.

3. Define scheduled and unscheduled maintenance.

4. What are the two categories of maintenance?

2–2. The Maintenance Complex

The aircraft maintenance complex is designed to produce the appropriate aircraft utilization rate under combat conditions. It's structured so all of its organizations function in peacetime the same way they fight during war. In this section, we will look at how the maintenance complex is structured, its key managers, and the most important support functions within the maintenance complex.

009. Organizational structure and key managers

In 1999, the Chief of Staff of the Air Force ordered a complete review of the structure of the AF logistic system. The process culminated in *The Air Force Chief of Staff Logistics Review* published in 2005. As a result, the Air Staff thoroughly examined a multitude of process issues and their corresponding impacts on organizational structure. This extensive review postured us to enhance the way we continue to produce and deliver air and space power in the future. In order to meet the purpose of the review the Air Force had to become organized in such a way to best use its available resources. This required simple, streamlined structures designed for seamless transition from peace to war.

Wing organizational structure

One of the results of the review was a new standard wing organizational structure. This standardized operations across the Air Force and enhanced our expeditionary capabilities. The groups within the wing were now aligned to focus on their essential core capabilities. Normally there are four groups assigned to a typical wing, each one having a specific purpose. A wing has a distinct mission with a significant scope and is usually composed of a primary mission group (e.g., operations, training) and the necessary supporting groups. A wing may be either an operational wing, an air base wing, or a

specialized mission wing. For the purpose of this course, however, we are only going to examine the groups, squadrons, and flights to which you, as a 2W1X1, can be assigned.

Maintenance group

Aging fleets and continuous resource shortfalls require increased attention to the balance of sortie production and the health of our fleets. This requires career maintenance professionals who are able to develop the same level of skill and proficiency demanded of our operations, mission support, and medical professionals. As a 2W1, you will be assigned to the maintenance group, which supports the primary mission with weapon system maintenance. This includes maintenance training, on-equipment maintenance, and off-equipment maintenance. Normally, the maintenance group consists of four squadrons (Maintenance, Aircraft Maintenance, Maintenance Operations, and Munitions); however, this can change depending on the base to which you have been assigned.

Squadrons

Squadrons are the basic "building block" organization in the Air Force, providing a specific operational or support capability. During your career as a 2W1, you will spend a majority of your time assigned to the Aircraft Maintenance squadron (AMXS) and the Maintenance squadron (MXS).

AMXS

If you are assigned to the Aircraft Maintenance squadron you will be dealing with the on-equipment maintenance side of the flight line. The AMXS provides direct support by consolidating and executing on-equipment maintenance activities necessary to produce properly configured, mission-ready weapons systems to meet contingency or training mission requirements. After being assigned to an AMXS you will be given to an aircraft maintenance unit (AMU). This AMU is responsible for servicing, inspecting, maintaining, launching, and recovering its assigned aircraft and ensuring all mobility requirements are met.

MXS

Now, if you become assigned to the Maintenance squadron, you will be dealing with the off-equipment side of our career field and placed in the Armament flight. The armament flight performs off-equipment maintenance of weapons release systems, guns, munitions racks, adapters, pylons, and launchers to support the AMXS's assigned aircraft. On occasion the Armament flight can be assigned in the Munitions squadron. Regardless of which squadron you are assigned, you will have a significant role to play in the accomplishment of the mission.

Weapons section breakdown

In the AMU you will be assigned to the weapons section and placed on a crew. The weapons section is responsible for supporting flight-line munitions loading/unloading and weapons maintenance operations. The weapons section may consist of two elements: weapons loading and weapons maintenance. Regardless of which element you may be placed into, all weapons section personnel are trained and utilized in both functions as needed to maximize both mission capability and develop individual functional expertise.

Loading element

The weapons loading element is responsible for munitions loading and unloading during daily aircraft training, operational test and evaluations (OT&E), and contingency operations. If a weapons maintenance element is not formed within the section, the loading element will be responsible to perform all on-equipment armament maintenance.

Normal duties performed by the loading element are as follows:

- Load and unload munitions/weapons in support of daily/contingency operations.
- Install and remove armament-related suspension equipment, launchers, adapters, pylons, and so forth on assigned aircraft.

- Perform functional/stray voltage checks required for loading operations.
- Provide assistance to the maintenance element, when required.

Maintenance element

The weapons maintenance element is responsible for all on-equipment weapons maintenance, to include fault isolation and troubleshooting. In some circumstances the maintenance element may be required to perform munitions loading/unloading operations.

Normally maintenance element workers perform the following duties:

- Install/remove all armament AME and NIE to facilitate other maintenance or for repair action, to include acceptance/transfer inspections.
- Perform aircraft troubleshooting and repair actions.
- Perform aircraft armament systems functional checks and associated –6 inspection requirements on in-use AME and NIE.
- Boresight aircraft guns and gun pods.
- Perform aircraft armament systems preflight, thruflight, and basic post operation (BPO) inspections.
- Perform on-equipment TCTOs.
- Maintain qualification on designated weapons-related qualification tasks for the unit. Maintenance personnel are normally not certified as load crewmembers unless there are insufficient personnel assigned to the loading section (element) to maintain a specified number of load crew requirements.

Armament flight breakdown

As mentioned above the Armament flight performs off-equipment maintenance for assigned armament systems, guns, pylons, racks, launchers, and adapters. The Armament flight normally consists of three sections: armament maintenance section, AME section, and support section.

Armament maintenance section

The armament maintenance section performs TCTOs, inspection and maintenance on assigned armament systems, guns, pylons, racks, launchers, and adapters. The duties of the armament maintenance section include the following tasks:

- Schedules and performs all inspections, TCTOs, time changes, maintenance, and repair actions for aircraft armament systems components and AME, including AME items preloaded with munitions for contingencies.
- Advises the flight chief of any factors limiting the maintenance capability.
- Maintains war reserve materiel (WRM) assets.
- Maintains equipment historical records (AFTO Form 95) by hardcopy or through an automated process Integrated Maintenance Data System (IMDS) for AME, aircraft guns, and weapons systems NIE.
- Coordinates with the Operations Support squadron (OSS) plans, scheduling, and documentation (PS&D) for equipment requiring in-shop inspections. When possible, calendar NIE inspections are scheduled in conjunction with the nearest aircraft hourly inspection within the calendar interval.
- In coordination with the OSS PS&D, requisitions parts to satisfy time change requirements for aircraft armament or gun system components not identified in the applicable aircraft –6 TO.

- Performs off-equipment acceptance/transfer inspections on aircraft, to include NIE and AME. These inspections include a parts integrity inspection, a complete electrical and mechanical check to include associated cables, and updates to each item's historical record.
- Performs the armament system portion of aircraft inspections.

When the maintenance section is responsible for supporting more than one flying/bomb squadron, it is divided into combat armament support teams (CAST). Each CAST provides exclusive support (to the maximum extent possible) to the flying squadron to which they are aligned.

AME section

The alternate mission equipment section accounts for, stores, and controls AME in support of their assigned aircraft. Some of its more specific duties are:

- Maintains F–2–type trailers for mobility. Trailers placed in-use receive pre/post-use serviceability inspections. Develops periodic inspections requirements (maximum interval of 18 months) for trailers in storage to include corrosion inspection/preservation treatment, tire inflation check and wheel bearing, and chassis lubrication.
- Unpacks/packs assigned AME in storage and delivers it to the maintenance element for inspection.
- Develops and implements a program for documenting issues and receipts of in-use AME.
- Lists assets as special purpose recoverable authorized maintenance (SPRAM), if required.

Support section

The support section stores and maintains required tools and equipment and manages the supply/bench stock functions for the entire Armament flight. Additionally the supply element performs the following functions:

- Performs user calibration and maintenance on flight test measurement and diagnostic equipment (TMDE).
- Coordinates with the precision measurement equipment laboratory (PMEL) to ensure PMEL calibration requirements are met.
- Maintains supply management documents.
- Maintains the master identification (ID) listing.
- Manages consumables.
- Manages residual and bench stock.
- Maintains composite tool kits (CTK), tool storage area, and test equipment.

Key managers and leaders

There are many managers within the maintenance complex. Each manager has specific responsibilities required to keep the maintenance complex running smoothly. Although each manager is needed, there are key individuals who affect the functioning of the complex significantly. These key individuals range from the wing commander down to the element chiefs. At this point, we are concerned with the wing and group commanders, so let's look at their responsibilities.

Wing commander

The wing commander is the key individual in the application of maintenance resources to meet mission requirements. He or she must ensure the various groups that make up the wing establish a close working relationship. The wing commander must assure the groups participate in all organizational planning, programming, and budgeting actions. He or she also establishes a balance between the operations group's requirement for sorties and maintenance group's maintenance capability.

Group commanders

Group commanders, more specifically, the maintenance group commander (MXG/CC) is responsible for on-/off- equipment maintenance required to accomplish sortie production and the wing mission, and the operations group commander is responsible for sortie production. These two commanders must work hand in hand in planning, scheduling, directing, and controlling of all maintenance resources to meet the mission requirements. Their jobs require them to plan, control, and manage all maintenance work, review information on forecasted workloads and missions, project the workload, and then plan accordingly. They are the individuals who have the final authority in establishing priorities for work.

Wing weapons manager

The wing weapons manager (WWM) will be a 2W1 CMSgt who is assigned directly to the maintenance group. However, within the AFRC, the senior weapons loading supervisor is the WWM. The WWM is the wing's focal point for all weapons loading and armament systems–related matters. The WWM's primary efforts focus on compliance, continuity, and standardization. Weapons activities required to support the generation of peacetime training sorties generally do not reinforce primary combat skills. Therefore, the WWM plays a key role in ensuring that the unit is able to produce combat loaded aircraft. The WWM is charged with providing technical and managerial advice to senior leaders in matters of weapons loading and armament systems. The WWM coordinates with the weapons sections, armament systems flight, wing weapons and tactics, the munitions flight, and other unit agencies on weapons-related matters. The WWM has the authority to cross group and squadron functional lines. Refer to AFI 21–101 for additional information on weapons managers' responsibilities.

Weapons standardization

Weapons standardization (WS) plans and conducts nuclear and nonnuclear weapons load certification and training requirements to support unit tasking and operational plans. WS is formed under the WWM and is comprised of the superintendent, the loading standardization crew (LSC), academic instructors, and lead crews (LC).

Loading standardization crew

The LSC works for the WS superintendent and manages the WS program. The LSC chief must be at least a TSgt 2W171. The LSC trains, evaluates, and certifies the LC and load crews in safe and reliable munitions loading procedures. The LSC conducts and monitors training to ensure personnel maintain a high degree of proficiency in loading unit committed munitions or test/training munitions. They also monitor certification and recurring training documents to ensure all load crew members complete required proficiency and academic training.

Lead crews

The LC are assigned to the WS and assist the LSC in training, evaluating, and certifying unit load crews in safe and reliable munitions loading procedures. They document, initiate, and maintain the database to reflect qualification, certification status, and history of assigned load crew members. Ensure all load crew members complete required proficiency/academic training and take decertification action when recurring requirements are not met. They bear the primary responsibility for performing spot inspections and evaluations of flight-line munitions/explosive handling and loading operations when not directly involved in WS training functions and provide monthly proficiency required load (MPRL)/qualification credit to the maximum extent.

Weapons section

Weapons section expediters are assigned to manage flight-line/explosives operations. In squadron-sized fighter units, maintenance authorizations and responsibilities may be combined with those of the armament systems flight. Weapons personnel in helicopter units are assigned to the specialist flight and are responsible for both flight-line and armament flight duties. The weapons section

noncommissioned officers in charge (NCOIC) assist the WWM in recommending distribution of the wing's 2W1 personnel to satisfy weapons loading and on-equipment/armament systems maintenance needs. The weapons section NCOIC advises the squadron commander and notifies the WWM regarding factors affecting training, weapons loading or maintenance capabilities, load crew or personnel reliability program (PRP) status, equipment and tester shortfalls, and other key weapons-related issues. They also ensure the required number of load crews are trained and certified as specified in the UCML or the TTML to perform the mission and maintain load crew integrity during training and evaluations to the maximum extent possible. Refer to AFI 21–101 for additional duties.

010. Staff support functions

The key managers use staff functions to manage and report the status of the maintenance complex. They are streamlined to concentrate on essential tasks, avoid redundancy, and allow maximum maintenance production. Let's look at these staff functions.

Maintenance Operations Center

The MOC directs, monitors, and coordinates the implementation of the flying schedule and the scheduled maintenance plan and unscheduled maintenance. They request support services, such as firefighting activity standby, snow removal, fueling and defueling service, civil engineering support, or control-tower clearances for ground movement of aircraft and equipment. They coordinate munitions delivery priorities for flying squadrons and munitions maintenance activities and inform all required agencies, including the fire department, of munitions loaded aircraft to include when each aircraft is loaded or unloaded with munitions. MOC dispatches the MXS to provide requested support.

Plans, scheduling, and documentation

The prime function of plans and scheduling is what its name implies–the planning and scheduling of the entire workload and work effort for the maintenance organization. They plan and schedule all maintenance and inspections and advise on maintenance capabilities, shortcomings, and adherence to schedules. They maintain the status and location of aerospace vehicles and equipment, including maintenance of equipment, to determine parts requirements to complete jobs.

Work scheduling and controlling are key points in any maintenance complex. If an important weapons system TCTO is not planned and scheduled, you may not know about it until someone rushes into your shop at the last minute to tell you the lengthy modification must be completed in two weeks. Special training may be required before the modification is started. Parts, tools, and special equipment may not be available because no one ordered them. Because of the lack of planning, the weapons system or equipment you have to work on may have an operational commitment that cannot be changed on such short notice. Using your own experience, you might be able to think of an infinite number of problems occurring if there is no planning or scheduling of maintenance work. Man-hour reporting and maintenance data reporting are very important in planning and scheduling maintenance because they tell you the jobs to schedule, what needs to be done, what is being done, and what already has been done.

Documentation maintains historical maintenance data. It is responsible for review, evaluation, and filing of information essential to planning and scheduling. This preservation of maintenance documents is a basic responsibility of initiators and of supervisory personnel.

Maintenance systems analysis and database management

The IMDS and Integrated Maintenance Information System (IMIS) are the primary sources of maintenance data today. They provide an abundance of data on equipment status, system and component malfunctions, and aircraft performance. Maintenance systems analysis and database management (DBM) manage the maintenance information system. The analysis of the information is used to improve equipment performance and the maintenance effort.

Maintenance supply liaison

The maintenance supply liaison (MSL) monitors the overall maintenance and supply interface. The MSL resolves supply support problems and coordinates supply-related training needs for the maintenance group. The MSL advises maintenance managers of support problems regarding the maintenance efforts and recommends corrective actions. When required, he or she provides dedicated supply support to the flying/bomb squadron support flight.

Quality assurance

The quality assurance program (QAP) is a dynamic inspection system designed to improve combat capability of assigned weapon systems through high-quality maintenance and effective maintenance training. Quality maintenance is the responsibility of individual maintenance technicians, supervisors, and commanders. The role of quality assurance (QA) is to determine aircraft and equipment condition and personnel proficiency (including the quality of training) and to increase reliability and maintainability. Aircraft and equipment condition and personnel proficiency are determined through the QAP. QAP determines the likely cause through data analysis from personnel evaluations (PE), technical inspections (TI), and management inspections. The QA inspection and evaluation program provides an objective sampling of equipment condition and maintenance personnel qualifications. QA manages the material deficiency reporting and TO improvement reporting programs, tracks technical data currency, applicability and usability, and maintains a central TO file. Wing QA activities are the singular management responsibility of the MX/CC.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

009. Organizational structure and key managers

1. What are the three types of wings?

2. How many squadrons does the maintenance group normally contain, and what are they?

3. Which two squadrons will you spend a majority of your time assigned to, and what type of equipment maintenance do they perform?

4. What are the responsibilities of the weapons section?

5. What sections make up the Armament flight, and what are their responsibilities?

6. Who is the key individual in the application of maintenance resources to meet mission requirements?

7. Which individuals are responsible for establishing a balance between sortie production and maintenance capabilities?

8. Which organization plans and conducts nuclear and nonnuclear weapons load certification and training requirements to support unit tasking and operational plans?

9. Who advises the squadron commander on factors affecting PRP status?

010. Staff support functions

1. What staff support function is responsible for coordinating munitions delivery priorities?

2. What is the purpose of the documentation element of PS&D?

3. What staff function is responsible for managing the maintenance information system?

4. What is the role of QA?

Answers to Self-Test Questions

007

1. To preclude the loss of operating efficiency, to ensure maximum production in minimum time, and to obtain a complete picture of where and when difficulties occur in maintaining equipment.
2. (1) A well-organized management structure.
   (2) Latitude for MAJCOMs to tailor and streamline command management policy and procedures.
   (3) An efficient method of reporting maintenance data.

008

1. Organizational, intermediate, and depot.
2. (1) Train technicians to use standardized practices and follow technical data and publications.
   (2) Use highly qualified technicians to evaluate personnel and equipment.
3. Scheduled maintenance—planned or programmed maintenance.
   Unscheduled maintenance—unpredictable/unplanned maintenance requirements.
4. On-equipment and off-equipment.

009

1. Operational, air base, or specialized mission.
2. Four; Maintenance, Aircraft Maintenance, Maintenance Operations, and Munitions.

3. AMXS, which performs on-equipment maintenance, and the MXS, which performs off-equipment maintenance.
4. The weapons section is responsible for supporting flight-line munitions loading/unloading and weapons maintenance operations.
5. (1) Armament maintenance section performs TCTOs, inspection, and maintenance on assigned armament systems, guns, pylons, racks, launchers, and adapters.

   (2) AME section accounts for, stores, and controls AME in support of their assigned aircraft.

   (3) Support section stores and maintains required tools and equipment and manages the supply/bench stock functions for the entire Armament flight.
6. Wing commander.
7. Group commanders.
8. WS.
9. Weapons section NCOIC.

010

1. MOC.
2. It maintains historical maintenance data.
3. Maintenance systems analysis and DBM.
4. To determine aircraft and equipment condition and personnel proficiency and to increase reliability and maintainability.

Complete the unit review exercises before going to the next unit.

Unit Review Exercises

Note to Student: Consider all choices carefully, select the *best* answer to each question, and *circle* the corresponding letter.

19. (007) An effective Air Force maintenance management system must have
    a. a large number of specialists and a large inventory of equipment.
    b. strict control of equipment and facilities and a free flow of information.
    c. supervisors trained in all aspects of maintenance and technicians who can follow orders.
    d. a well-organized management structure, latitude for MAJCOMs to tailor and streamline command management policy, and an efficient method of reporting maintenance data.

20. (008) If possible, maintenance should be accomplished on which basis?
    a. Planned.
    b. Scheduled.
    c. As needed.
    d. Unscheduled.

21. (008) In conjunction with using qualified technicians to evaluate personnel and equipment, what other method do organizations use to achieve standardization?
    a. Scheduling maintenance.
    b. Non-judicial punishment.
    c. Repetitive equipment testing.
    d. Standard practices and strict technical data usage.

22. (008) What type of maintenance is generated during the process of using equipment?
    a. Corrective.
    b. Preventative.
    c. Precautionary.
    d. Prescheduled.

23. (008) What are the two categories of maintenance?
    a. Depot and home station.
    b. Flight line and back shop.
    c. Scheduled and unscheduled.
    d. On-equipment and off-equipment.

24. (008) On-equipment maintenance refers to maintenance tasks that are effectively performed on weapons systems or which piece of equipment?
    a. Aircraft.
    b. End-item.
    c. Equipment with an “X” in the ERRC code.
    d. Equipment valued at more than one million dollars.

25. (008) What category of maintenance refers to a task that requires the removal of a component to a shop or facility for repair?
    a. Scheduled.
    b. Unscheduled.
    c. On-equipment.
    d. Off-equipment.

26. (009) What are the three different types of wings?
    a. Logistics, Combat, Training.
    b. Medical, Operations, Maintenance.
    c. Operational, Air Base, Specialized Mission.
    d. Aircraft Maintenance, Maintenance, Mission Support.

27. (009) Within the maintenance complex what is referred to as the “building block” organization of the Air Force, providing a specific operational or support capability?
    a. Wing.
    b. Flight.
    c. Group.
    d. Squadron.

28. (009) Which organization is responsible for servicing, inspecting, maintaining, launching, and recovering their assigned aircraft?
    a. Maintenance group.
    b. Maintenance squadron.
    c. Aircraft Maintenance unit.
    d. Aircraft Maintenance squadron.

29. (009) Who supports flight-line munitions loading/unloading and weapons maintenance operations?
    a. Avionics section.
    b. Weapons section.
    c. Armament flight.
    d. Support flight.

30. (009) Which maintenance complex element is responsible for munitions loading/unloading during daily aircraft training, operational test and evaluation, and contingency operations?
    a. Loading.
    b. Munitions.
    c. Armament.
    d. Maintenance.

31. (009) Who is responsible for all on-equipment weapons maintenance?
    a. Loading element.
    b. Maintenance element.
    c. Armament maintenance section.
    d. Alternate mission equipment section.

32. (009) Which armament flight section performs time compliance technical orders, inspections, and maintenance on assigned armament systems, guns, pylons, racks, launchers, and adapters?
    a. Support.
    b. Loading.
    c. Armament maintenance.
    d. Alternate mission equipment.

33. (009) Which section develops and implements a program for documenting issues and receipts of in-use alternate mission equipment?
    a. Alternate mission equipment.
    b. Armament maintenance.
    c. Weapons maintenance.
    d. Support.

34. (009) Who is considered the key individual in the application of maintenance resources to meet mission requirements?
    a. Base commander.
    b. Wing commander.
    c. Squadron commander.
    d. Production flight NCOIC.

35. (009) What organization is formed under the wing weapons manager (WWM) and is comprised of the superintendent, the loading standardization crew (LSC), academic instructors and lead crews?
    a. Weapons safety.
    b. Quality assurance.
    c. Group evaluation.
    d. Weapons standardization.

36. (009) Who is *primarily* responsible for monitoring certification and recurring training documents to ensure all load crew members complete required proficiency and academic training?
    a. Wing weapons manager.
    b. Standardized load crews.
    c. Weapons section NCOIC.
    d. Loading standardization crew.

37. (009) Who ensures the required number of load crews are trained and certified as specified in the Unit Committed Munitions List (UCML) to perform the mission and maintains load crew integrity during training and evaluations to the maximum extent possible?
    a. Quality assurance.
    b. Wing commander.
    c. Weapons section NCOICs.
    d. Load standardization crews.

38. (010) Which staff function plans and schedules the entire workload and work effort for the maintenance organization?
    a. Production superintendent.
    b. Maintenance supply liaison.
    c. Maintenance operation center.
    d. Plans, scheduling, and documentation.

39. (010) What is the quality assurance (QA) program?
    a. A condition and status system to improve utilization.
    b. A dynamic inspection system to improve combat capability.
    c. An aircraft utilization program to improve combat utilization.
    d. An equipment utilization program to improve combat capability.

40. (010) Which staff function determines aircraft and equipment condition and personnel proficiency (including the quality of training)and to increase reliability and maintainability?
    a. Quality assurance.
    b. Maintenance supply liaison.
    c. Maintenance operation center.
    d. Plans, scheduling, and documentation.

41. (010) What staff function manages the material deficiency reporting and technical order (TO) improvement reporting programs, tracks technical data currency, applicability and usability, and maintains a central TO file?
    a. Quality assurance.
    b. Maintenance supply liaison.
    c. Maintenance Operation Center.
    d. Plans, scheduling, and documentation.

Please read the unit menu for unit 3 and continue ➔

Unit 3. Maintenance and Material Management

WE HAVE DISCUSSED the maintenance organization, and you are probably wondering if these various maintenance organizations are really interested in you and the work you do. Your commander cannot supervise everyone in the organization personally, nor can he/she stop by all the time to see each individual and make sure he/she is being used effectively on the job; but he/she does know if the organization's resources are properly used and if the unit is productive. Remember the modification someone forgot to schedule and plan? The commander and staff want to know what happened and ways to prevent this type of situation from recurring in the future. Something is needed to detect the improper or uneconomical use of resources and to inform management of how much time and material is spent on each job. This is where the maintenance information system we use becomes a useful tool.

Some of the systems the Air Force uses to collect and process maintenance information are IMDS, IMIS, maintenance data collection (MDC) system, and a material deficiency reporting (MDR) system. In this section, we will briefly discuss the systems with which you will work. We will also explain the documents and forms you will use in reporting your maintenance for these systems.

3–1. Maintenance System

Over the years, the Air Force has devised and put into effect various maintenance management and data collection systems. As time went by, weapons systems became more complex and the need for data collection systems increased. To meet the demand, the maintenance management and collection systems were modified a little at a time. The results were complicated systems that didn't meet the requirements of the maintainers. Originally, systems using paper punch cards were used to store and enter data. This system gave way to huge room–filling mainframe-based systems using dedicated access terminals that were only usable in this system. As computers progressed in both power and ease of use, the system moved to a smaller base-sized network; this further evolved into an Internet-based system allowing nearly universal access from anywhere on the globe.

011. Integrated Maintenance Data System

Older maintenance data tracking systems required a thorough understanding of a cryptic combination of codes and jargon that were unusable anywhere else. Any data placed in an inappropriate field would result in a string of cryptic error messages that did little to inform the maintainer what correction or further information was needed. A new system was created to make the data entry process much more user friendly to the maintainers. The resulting system is called the IMDS.

Description

IMDS functions as a single database that accesses maintenance information, scheduling data, historical records, and logistical data. The purpose of IMDS is to store maintenance data needed by MAJCOMs, headquarters (HQ) USAF, AFMC, and other agencies to manage and track maintenance resources worldwide. The system applies to aircraft, missile, and communication-electronics maintenance. The design of IMDS is flexible to support changes in logistics infrastructure size, quantity, and mission orientation, whether at home base or deployed. IMDS flexibility allows unit-level selection of system functions.

System operation

A single, integrated database structure places maximum emphasis on data retrieval by weapons systems and supports response time requirements. Application programs operate on individual computers so that appropriate levels of support are still maintained despite losses of higher-level computer interfaces. This gives any unit-level operation the essential data needed to continue vital maintenance functions during periods of communications difficulty or at deployed operations.

Unlike older systems, IMDS makes use of a graphics user interface (GUI) displayed on standard personal computers. The GUI is a Windows-style point-and-click format that provides access to the IMDS screens via the Internet. This interface is intended to improve usability and data integrity, as well as reduce user frustration caused by rejected transactions. This is accomplished by providing reference data to the user as “pick lists” (called dropdowns, pop-ups, or dynamic retrievals). Reference data consists of things such as work unit code (WUC)/logical configuration number, type maintenance code, How Mal code, equipment designator, AFSC, and so forth. The number of rejects due to improper data being entered will be reduced since the “pick lists” provide only valid data for the user to select. Many GUI screens have additional upfront edits incorporated so the user will be notified that something needs to be corrected before ever sending the transaction to IMDS servers for processing. These edits will save the user time since they won’t need to wait for the IMDS server to process the transaction, find a problem, and then return a reject to be corrected.

IMDS GUI screens are task oriented and menu driven (laid out in a more logical and intuitive order) to make them more readily understandable to the user. The main menu screen has been changed to provide a link to a single subsystem menu for each area of the IMDS system. The new main menu eliminates having to go through multiple menus to find the information or screen you want.

012. Integrated Maintenance Information System

With the inclusion of the F–22 into the inventory, a new way of tracking and integrating maintenance data has been created. The new system in place to support the F–22 is called the IMIS.

Integrated Maintenance Information System capabilities

IMIS is a secure, automated maintenance tool set to support both on- and off-equipment maintenance for the F–22 aircraft. IMIS is a squadron-level tool; hardware includes a pilot debrief station, portable maintenance aid (PMA) interface stations, and a supervisor station. The central component of the IMIS is the maintenance server unit (MSU). The MSU acts like the mainframe of the computer network. It coordinates all information flow in the system and maintains the central recordkeeping data for the network. It is also is the conduit for all information either entering the IMIS system or departing from it.

IMIS is not a total replacement for the IMDS system. It is used as a system for local MDC and maintenance only at the unit level, so at this level it does function as a replacement of the IMDS system. The IMIS system has the ability to communicate with the IMDS system to convey information to its data systems for evaluation and dissemination of information to units outside the F–22 community.

IMIS allows the maintainer to have single-point access to virtually all systems required to support F–22 maintenance and maintenance-related tasks. The IMIS system allows the maintainer to access forms, technical data, troubleshooting, and even parts-ordering applications with a single access point. The interface also allows the user to use intuitive tools, such as hotspots, to essentially point-and-click parts in illustrated parts breakdowns (IPB) to order them, easing the workload on the maintainer. The system also allows leadership to get near real-time access to fleet maintenance status.

The IMIS user interface is laid out in a desktop-style environment called the common desktop environment (CDE) that many computer users adapt to with little to no effort (fig. 3–1). The CDE is divided into four main areas discussed in the following table:

Common Desktop Environment	
Functions	**Description**
Maintenance functions	This section contains most of the functions usable in performance of maintenance tasks. Common applications include forms access, aircraft status board, and recording of munitions expenditures.
Engine	This section includes the majority of engine-specific monitoring applications. This is *not a commonly used area* for 2W1s.
Utilities	This section contains most of the applications involving the maintenance aid or computer platform itself. Common applications are TO change request creation, connection of the computer to the maintenance server unit, and the IMIS help file.
Management functions	This section relates to actions that need to be accessible to supervisors and leadership. Common applications the personnel management and TO data change review application.

Navigating to an application can be done via the mouse, or you can tab through the applications to the one desired. To open a specific application you can double click on the appropriate icon or press the return or space bar key. The IMIS system design will not allow instances of the same executable running multiple times.

Portable maintenance aid

The PMA (fig. 3–2) is the primary interface between the maintainer, the aircraft, and IMIS. A PMA is a rugged, lightweight, portable computer with a display screen, bezel buttons, keyboard, internal fixed and removable hard-drive storage devices with military standard (MIL-STD)–1553B bus and recommended standard (RS)–422 bus interfaces. As part IMIS, it accepts on-board diagnostic data, stores and presents electronic technical manual data, displays discrete fault isolation procedures, and provides corrective action procedures. The PMA has these functions:

1. Initiates built-in test (BIT).
2. Displays TO data.
3. Shows aircraft status summary.
4. Identifies probable cause and corrective action.
5. Collects diagnostic and consumable data from the aircraft.
6. Records maintenance actions and annotates/reviews electronic forms.

7. Provides maintainer with power mode control and weapons load control, normal auxiliary power unit (APU) start/shutdown.
8. Identifies required parts (per TO data), capability/control to load operational fight programs (OFP) and mission data.

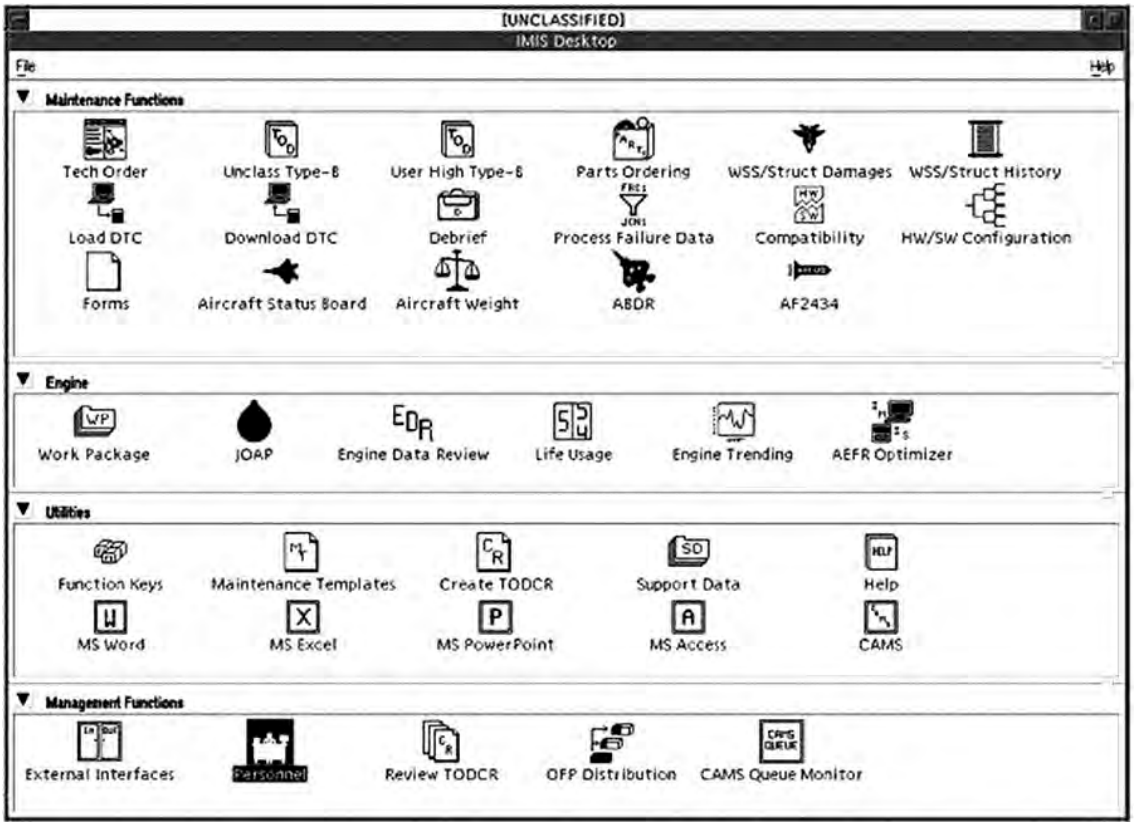


Figure 3–1. Common desktop environment.

Figure 3–2. Portable maintenance aid.

The PMA has the capability to record maintenance actions as they occur. It interfaces directly with the aircraft via PMA connection ports for access to aircraft status and control of data uploads and downloads.

The PMA communicates with the unit MSU through a process called *docking*. When the PMA is placed into a docking cradle, the PMA connects to the MSU through the network and uploads or downloads data to or from the system as needed. The PMA must be docked multiple times during the day to ensure the most up-to-date information is available to all users. The PMAs currently in use also have the capability to network with the MSU through a radio frequency (RF) connection. This allows the PMA to communicate with the MSU regardless of its physical location as long as it stays within range of the network. This capability is not available in all locations or for all units and is only used on an as-available basis.

013. Maintenance data documentation process

The maintenance date documentation (MDD) process starts with the follow-on operational test and evaluation of equipment cycle and extends through the operational phase of the life cycle of equipment. This usually occurs when the equipment is first delivered to the AF inventory and extends through the operational phase of the equipment. The objectives of the MDD process are to provide a vehicle for: collecting, storing, and retrieving base-level, depot-level, and contractor-type maintenance data. This data is used in support of the USAF equipment maintenance program, reliability and maintainability improvement program, and the maintenance management system procedures.

The MDD process includes collection, storage, and retrieval. The process provides for data collection and monitoring of maintenance discrepancies. This documentation is put into the computer, analyzed, and then summarized to provide the following:

1. Feedback for managers and supervisors to control maintenance on base.
2. Logistical information for AFMC and other MAJCOMs to identify maintainability and reliability problems on AF equipment.
3. Data on AF-wide capability to bases, major commands, and HQ USAF for assessment and approval.
4. Determination of the cost of base-level operations by HQ USAF Accounting and Finance.

These benefits may not become apparent to you right away, but a great portion of the cost of this system is returned to the Air Force through better logistic management decisions made with factual information.

Purpose of maintenance data collection

The data provided to the MDC system is collected through the MDD process. It consists of information on what work was done, which work center did it, how many man-hours were expended, and why the work was necessary (what was wrong with the equipment). MDC cannot solve problems; it merely identifies them so management can solve them through appropriate actions. This system was designed as a tool for the management of maintenance resources. It provides data to managers at base level, to management at intermediate and major command headquarters, and to AFMC to handle materiel management and logistic support requirements. You can readily see some of the questions management is able to answer by analyzing maintenance data. Below are several topics that management wants to know:

- The productivity and utilization of the work force and equipment available for operation.
- Mission capability.
- The efficiency of the entire maintenance operation.
- The status of TCTOs and other work.

- What work consumes a high number of man-hours?
- Components and equipment with a high-failure rate.
- The deficiencies discovered during regular inspections.

Uses of maintenance data

While you may already know many of the uses maintenance managers make of maintenance data in your own organization, you are probably not familiar with its importance at higher management level, particularly in the AFMC. Efficient operation of each Air Logistics Center (ALC) of AFMC depends on MDC from all the AF organizations maintaining the types of equipment to which the ALC provides logistical support. The ALCs perform the following:

1. Identifies equipment problems from an AF-wide standpoint and initiates actions to improve equipment.
2. Evaluates inspection and time change requirements based on usage of spares in the field.
3. Maintains status of TCTO accomplishments.
4. Determines spares requirements based on usage of spares in the field.
5. Analyzes items reported “not reparable this station” (NRTS).
6. Maintains accurate configuration, and stockpiles knowledge of each weapon.

When an equipment problem is indicated by the maintenance data, the ALC initiates a TCTO for a one-time modification of the equipment. The accuracy of your maintenance data reporting is absolutely essential to the reliability and quality of equipment.

F–22 maintenance data collection system

IMIS integrates technical data, fault ID, and repair procedures; this integration is known as diagnostic and health management (DHM). IMIS also serves as a technical aid during debrief; augments and complements on-board diagnostics; collects and manages aircraft maintenance-generated data; and interfaces with data systems required for maintenance, aircraft records (781 series), and operational flight program update capabilities. IMIS receives aircraft data via the data transfer cartridge (DTC) or micro-DTC and the PMA connection ports. Although capable of operating as a stand-alone system, IMIS incorporates the capability to communicate logistics data through a network connection to external computer-based systems, such as IMDS, and the Integrity Data Analysis Reporting System (IDARS).

During a typical maintenance action using the current legacy forms and MDC systems, a discrepancy recorded in forms needs to be transferred to IMDS. When the status of the discrepancy changes (i.e., job completion, symbol upgrade or downgrade, etc.), the aircraft forms and the relevant MDC system need to be reconciled to reflect the current status of the aircraft. IMIS eliminates the need for this reconciliation. IMIS automatically communicates with whatever relevant MDC system program required by a given write-up to ensure that system has up-to-date information. This process is conducted independent of user input other than the original data entered into the aircraft forms.

014. Aircraft maintenance forms

By now you should have a basic understanding of the methods of tracking, retrieving, and storing of maintenance data. Now we are going to focus on one of the main sources of that data that you will have a direct impact on producing, aircraft forms.

AFTO Form 781A, Maintenance Discrepancy and Work Document

781A-series forms are used to provide maintenance, inspection, service, configuration, status, and flight record of an aircraft. They are filed in a vinyl plastic binder and normally are kept with the aircraft. You use these forms to check the status of an aircraft before performing any maintenance or loading task. You also record your maintenance actions on these forms. The AFTO Form 781A

(fig. 3–3) is used to document each discrepancy discovered by the pilot or maintenance personnel and to document any corrective action taken to correct a discrepancy.

FROM	TO	MDS	SERIAL NUMBER	PAGE OF PAGES
20081122		A-10C	80-0171	

SYM	JCN	DATE DISC	DOC NO.	CF	XF	DATE CORRECTED
X	083260390001	20081122		☐ 781A	☐ 781K	

WUC/REF DESIGNATOR	FAULT CODE	STA CODE	CORRECTIVE ACTION
75A00			

DISCREPANCY: Gun system Removed

CORRECTED BY	EMPLOYEE NO.

DISCOVERED BY (Print)	EMPLOYEE NO.	INSPECTED BY	EMPLOYEE NO.
G. Washington	00001		

SYM	JCN	DATE DISC	DOC NO.	CF	XF	DATE CORRECTED
				☐ 781A	☐ 781K	

WUC/REF DESIGNATOR	FAULT CODE	STA CODE	CORRECTIVE ACTION

DISCREPANCY

CORRECTED BY	EMPLOYEE NO.

DISCOVERED BY (Print)	EMPLOYEE NO.	INSPECTED BY	EMPLOYEE NO.

SYM	JCN	DATE DISC	DOC NO.	CF	XF	DATE CORRECTED
				☐ 781A	☐ 781K	

WUC/REF DESIGNATOR	FAULT CODE	STA CODE	CORRECTIVE ACTION

DISCREPANCY

CORRECTED BY	EMPLOYEE NO.

DISCOVERED BY (Print)	EMPLOYEE NO.	INSPECTED BY	EMPLOYEE NO.

AFTO FORM 781A, 20020617 (IMT-V1) MAINTENANCE DISCREPANCY AND WORK DOCUMENT

Figure 3–3. AFTO Form 781A.

AFTO Form 781K, Aerospace Vehicle Inspection, Engine Date, Calendar Inspection and Delayed Discrepancy Document

AFTO Form 781K's primary purpose is to document calendar item inspections and delayed discrepancies. Your primary interest in this form (fig. 3–4) is block C, Calendar and Hourly Inspection Schedule. This block indicates items to be inspected, at what interval, and when the next inspection is due. The reverse side of the form (Block D) is used to document urgent action and outstanding routine action TCTOs and delayed discrepancies.

FROM	TO	MDS	SERIAL NUMBER
20081122	20081122	A-10C	80-0171

A. AEROSPACE INSPECTION STATUS

NEXT PERIODIC, MAJOR, OR PHASED INSPECTION DUE NO.					
TYPE	COMPL	NEXT DUE	COMPL	NEXT DUE	

B. ENGINE DATA

PSN	ENG SER NO	ENG CHANGE DUE TIME	PSN	ENG SER NO	ENG CHANGE DUE TIME
1			5		
2			6		
3			7		
4			8		

C. CALENDAR AND HOURLY INSPECTION SCHEDULE

INSPECTION ITEM	FREQUENCY	NEXT DUE	NEXT DUE	NEXT DUE	NEXT DUE
Weapons 30 day functional check	30	20081122			

AFTO FORM 781K, 20020617 (IMT-V1)
PREVIOUS EDITION IS OBSOLETE

AEROSPACE VEHICLE INSPECTION, ENGINE DATA, CALENDAR INSPECTION AND DELAYED DISCREPANCY DOCUMENT

Figure 3–4. AFTO Form 781K.

AF IMT 2430, Specialist Dispatch Control Log

The AF IMT 2430 is the primary form used to list all the jobs to be completed for the day and the technicians performing the tasks. This form normally is filled out by the weapons expediter. The AF IMT 2430 is an important document as it involves tracking your normal day's activities, such as the removal and installation of AME and line replaceable units (LRU) as well as aircraft configuration changes. Keeping this current throughout the day provides a snapshot to your team chief and expediter on how the shift is progressing through the daily tasks. Each shift uses its own AF IMT 2430 form to track its operations, making sure to carry forward incomplete or required maintenance tasks to the next shift's AF IMT 2430. Units may maintain one single AF IMT 2430 for weekly/monthly scheduled maintenance, in addition to the daily shift AF IMT 2430. Your expediter transcribes any actions not complied with or cancelled to the next week's schedule maintenance 2430. Locally modified AF IMT 2430s are authorized *only* with WWM approval.

F–22 aircraft forms system

The F–22 does *not* use traditional paper forms. All aircraft status and discrepancy information is stored in the IMIS database and maintained on the MSU and individual mass memory on the aircraft. The aircraft forms application is accessed through an icon on the IMIS desktop. Once operating in the forms application, the data-entering process is driven by a series of hot buttons on the application's main page allowing functions including job creation, job completion, adding events to existing jobs, viewing existing forms, TO viewing, and the filtering of maintenance actions to an particular group of write-ups to make manual searching easier.

The actual processing of the information in the aircraft forms has been greatly streamlined by drop-down menus where it is possible to eliminate repetitive entering of redundant information into the forms. The elimination of repeated entering of things, such as the date, reduces the time it takes maintainers to complete forms. It also cuts down on form-entry errors by maintainers. Other parts of the process, such as discrepancy entry, are similar to those laid out in preceding sections dealing with paper forms.

015. Equipment forms and condition tags

When you get your car repaired, you are given a complete record of the maintenance that has been performed. If you go to the same repair shop, they probably retain a record of all the maintenance that they have provided to you on that vehicle. This information might help them to diagnose problems that occur with your vehicle in the future and will give you a complete record of all maintenance performed on your car. If there are companies that are willing to do this for their customer's vehicle that costs in the tens of thousands of dollars, don't you think the American public deserves the same level of service with the millions of dollars' worth of equipment that they have entrusted to you?

AFTO Form 95, Significant Historical Data

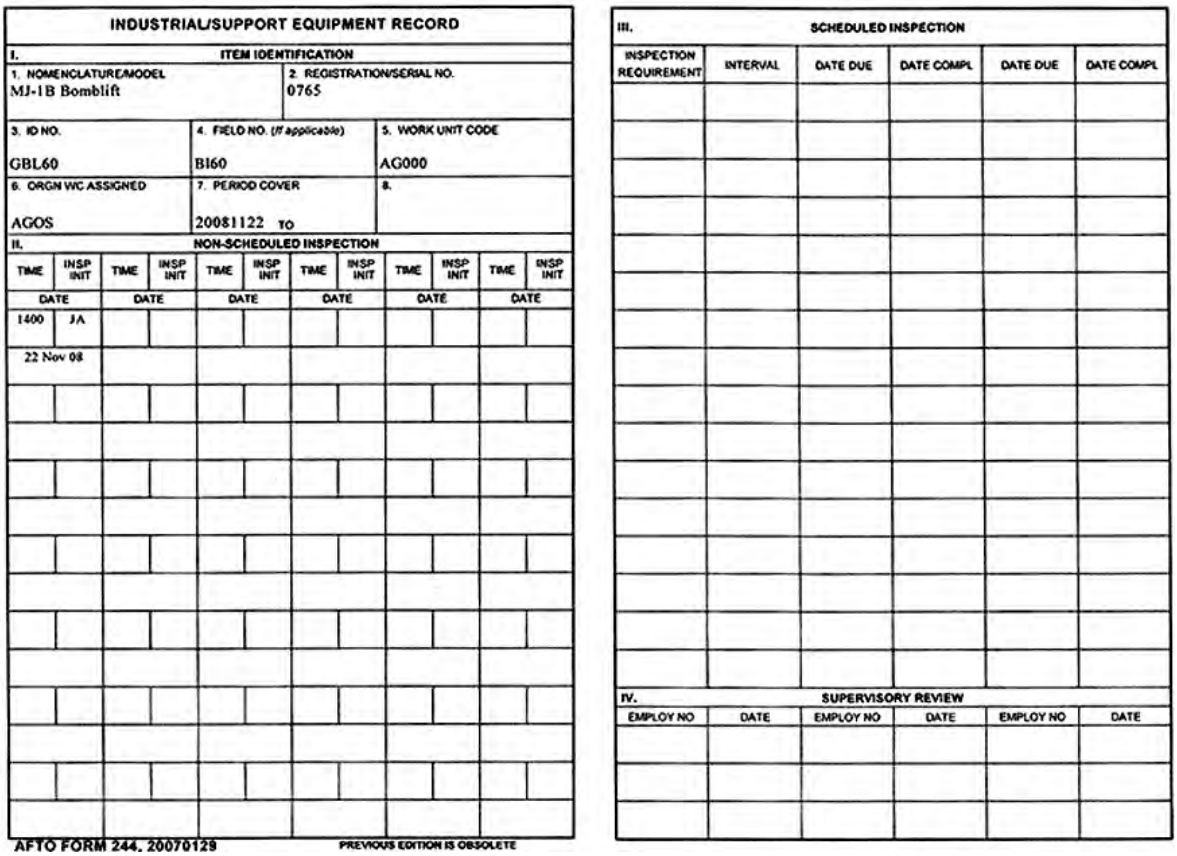
In the supply context, the term "end-item" has a slightly different definition than in the maintenance context. While in supply, the term still refers to items made up of a collection of parts or subassemblies. These need to form a complete product capable of performing a task or function, such as a pylon or missile launcher. Even though a pylon or missile launcher can be installed onto an aircraft, they are a stand-alone complete product. Therefore, in supply terms they are considered an end-item.

The AFTO Form 95 is a document, either automated or hard copy, used for maintaining a permanent history of significant maintenance actions on end-items. These end-items are things such as missile launchers, bomb racks, pylons, and guns. This form contains information on modifications, malfunction history, rounds fired, maintenance actions, times, dates, and specifics on each separate piece of equipment. It should be apparent from our discussion the AFTO Form 95 is a valuable tool for the maintenance manager. Take care to properly maintain this form. If the equipment is transferred to another organization, be sure the AFTO Form 95 accompanies it.

AFTO Forms 244/245, Industrial/Support Equipment Record

The AFTO Form 244 (fig. 3–5*)* is a five-part form that is used to document information and maintenance actions pertaining to AGE and certain pieces of test equipment.

- *Part I* provides a means to record the identity of the system or equipment to which the form is maintained.
- *Part II* is used to document required support equipment/trainer servicing inspection and prior-to-use inspections.
- *Part III* is where scheduled inspections are documented.
- *Part IV* is documented when quality control or supervisory reviews of the equipment forms are performed. The specific time intervals between supervisor reviews may be determined by the MAJCOM or delegated to the MX/CC. This section is not to be used for documenting inspections of completed maintenance actions.
- *Part V* is used to record delayed discrepancies on support equipment, training equipment, machine tools, and industrial plant equipment. It also is used to document overdue scheduled inspections, overdue time change, master configuration list (MCL), and TCTOs. You'll also use this section to document discrepancies you discover.



INDUSTRIAL/SUPPORT EQUIPMENT RECORD

I. ITEM IDENTIFICATION

1. NOMENCLATURE/MODEL	2. REGISTRATION/SERIAL NO.	
MJ-1B Bomblift	0765	
3. ID NO.	4. FIELD NO. (If applicable)	5. WORK UNIT CODE
GBL60	BI60	AG000
6. ORGN WC ASSIGNED	7. PERIOD COVER	8.
AGOS	20081122 TO	

II. NON-SCHEDULED INSPECTION

TIME	INSP INIT	TIME	INSP INIT	TIME	INSP INIT	TIME	INSP INIT	TIME	INSP INIT	TIME	INSP INIT
DATE		DATE		DATE		DATE		DATE		DATE	
1400	JA										
22 Nov 08											

III. SCHEDULED INSPECTION

INSPECTION REQUIREMENT	INTERVAL	DATE DUE	DATE COMPL	DATE DUE	DATE COMPL

IV. SUPERVISORY REVIEW

EMPLOY NO	DATE	EMPLOY NO	DATE	EMPLOY NO	DATE

AFTO FORM 244, 20070129 PREVIOUS EDITION IS OBSOLETE

Figure 3–5. AFTO Form 244.

The AFTO Form 245, Industrial/Support Equipment Record (Continuation Sheet), provides a means to document equipment discrepancies and corrective actions. It is used as a continuation form to Part V of the AFTO Form 244 or as a separate document without the AFTO Form 244. Use of the AFTO Form 245 is a MAJCOM option.

The equipment forms are attached to the equipment in a plastic envelope or other suitable weather-proof container. However, they may be maintained in a separate file when the use or size of the equipment makes it hazardous or impractical for them to accompany the equipment.

Condition tags and labels

During a typical duty day, thousands of equipment items are processed through AF maintenance and supply sections. All of these items must be readily identifiable as to their condition or status. In order to expedite maintenance operation, the Air Force uses a series of forms to indicate equipment status. These tags and labels are printed in various colors to indicate equipment condition or status at a glance. The primary difference between tags and labels is their method of attachment; tags are attached to equipment by string or wire, while labels have a gummed backing and are stuck to the equipment. The form number followed by a dash and an odd number always identify labels. For example, the Department of Defense (DD) Form 1577–3 is identified as label because 3 is an odd number, while the DD Form 1577–2 is a tag. A qualified inspector should label or mark each piece of AF property in some manner.

As an aircraft armament systems specialist, you should be familiar with the following condition and status tags:

1. DD Form 1574, Serviceable Tag (fig. 3–6)–Materiel, and DD Form 1574–1, Serviceable Label–Materiel (gold).

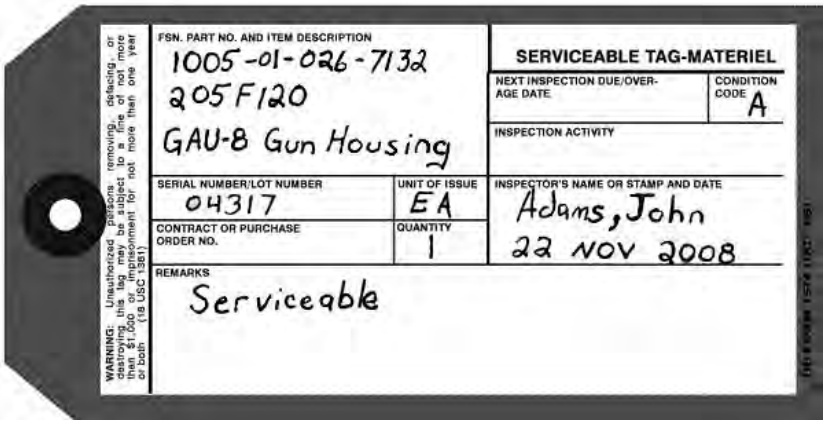


Figure 3–6. DD Form 1574.

2. DD Form 1575, Suspended Tag–Materiel (brown), and DD Form 1575–1, Suspended Label–Materiel (brown).

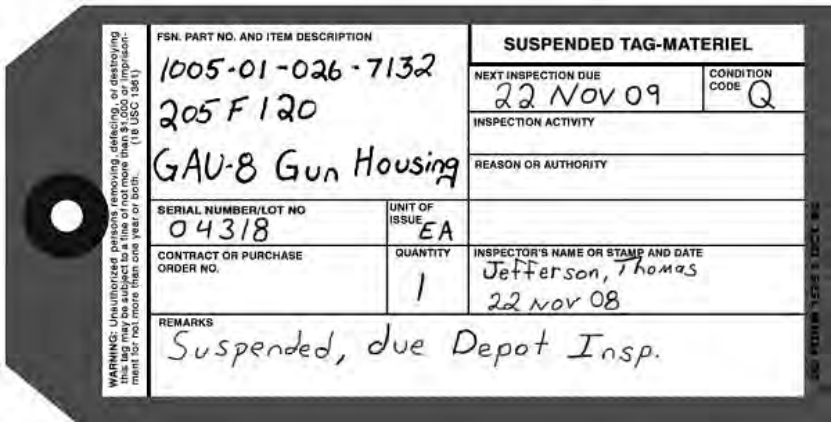


Figure 3–7. DD Form 1575.

3. DD Form 1577, Unserviceable (Condemned) Tag–Materiel, and DD form 1577–1, Unserviceable (Condemned) Label–Materiel (red).

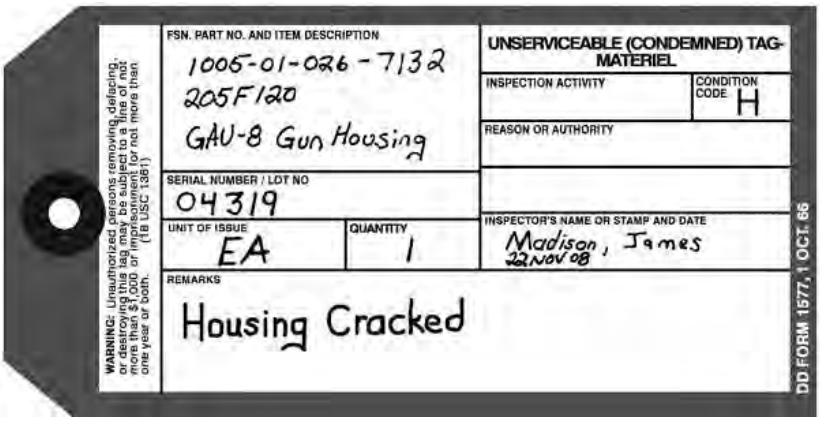


Figure 3–8. DD Form 1577.

4. DD Form 1577–2, Unserviceable (Reparable) Tag–Materiel, and DD Form 1577–3, Unserviceable (Reparable) Label–Materiel (green).

Figure 3–9. DD Form 1577–2.

NOTE: All of the previous forms are used in conjunction with the AFTO Form 350, Repairable Item Processing Tag.

The DD Forms 1574 and 1574–1 are used to indicate the identity and serviceable condition of property received, stored, and issued by the USAF. The golden color easily identifies these forms.

The DD Forms 1575 or 1575–1 identify materiel in stock suspended from issue, items returned to supply suspended from issue, and items on record turned over to a maintenance facility or a contractor.

The DD Forms 1577 and 1577–1 are used to indicate an unserviceable, condemned condition of an item or component. These forms indicate that the item is unserviceable and uneconomical to repair or the TCTO directs its condemnation. The red color of the form is a quick means of recognizing condemned parts.

The green-colored DD forms 1577–2 and 1577–3 indicate if an item or component is repairable. An AFTO Form 350 should accompany any items with these forms attached.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

011. Integrated Maintenance Data System

1. What is the overall purpose of IMDS?

2. How does the maintainer interface with IMDS?

012. Integrated Maintenance Information System

1. What is considered the central component of the IMIS?

2. What is the IMIS user interface called?

3. What is the *primary* interface between the maintainer, the aircraft, and the IMIS?

013. Maintenance data documentation process

1. When does the MDD system start?

2. What does AFMC and other MAJCOMs do with the data after it is collected?

3. Which MAJCOM is especially interested in maintenance data from a materiel management and logistics support standpoint?

4. List six ways ALCs use maintenance data.

014. Aircraft maintenance forms

1. What is the 781A used to document?

2. Which aircraft form is used to document what items are to be inspected, the inspection interval, and when the next inspection is due?

3. How do you access the forms application in IMIS?

015. Equipment forms and condition tags

1. State the uses and type of information that might be found on an AFTO Form 95.

2. AFTO Form 244/245 is used on what type of equipment?

3. Why does the Air Force use condition and status tags?

4. Explain when each of the following forms should be used:
   a. DD form 1574 and 1574–1.

   b. DD Form 1575 and 1575–1.

   c. DD FORM 1577 and 1577–1.

   d. DD Form 1577–2 and 1577–3.

3–2. Processing and Controlling Material

The AF supply system is a very large and complicated business. It must satisfy the needs of all organizations in the Air Force—from diaper pins to parts for spy satellites and from paper clips to ballistic missile launching systems. But, as far as you are concerned, the most important function of supply is to make sure you have the stuff you and your shop needs.

016. Expendable and nonexpendable supplies

Supplies fall into two categories: expendable and nonexpendable.

Expendable supplies

As used in supply transactions, the word “expendable” has several meanings. First, it refers to the type of accounting for a particular item while it is in use. Do not confuse it with such terms as “consumed” or “used up,” although they also refer to expendability. It also does not necessarily mean “low cost” or “inexpensive item.”

Expendable items are either consumed in use (i.e., pencils, paper, bombs, etc.) or they become a part of another assembly (i.e., an M61 A1 breech bolt or a BRU–47 arming unit, etc.).

Bench-stock supplies

Bench-stock supplies are items required on a recurring basis within the near or immediate work area. Bench-stock items are expendable items used by aircraft, missiles, munitions, armament, and automotive maintenance activities. They are obtained from various sources. If your activity needs to

use bench stock, base supply and your unit determine the items used most frequently. A 30-, 45-, 60-day stock of these supplies is stored in the unit so they are readily accessible to you to perform your duties.

Demand processing unit

All expendable items not in bench stock are available from the demand processing unit, part of the maintenance support section of base supply. Items, such as ejector pistons and wire bundles, are ordered through demand processing.

Nonexpendable supplies

You do not have to look too hard or long to find a nonexpendable item in the Air Force. They are all around you. Tables, chairs, trucks, testers, and power units are all examples of nonexpendable items. Many nonexpendable items, such as a snowplow or a fire truck, are built up from many subassemblies. Your local equipment management section (EMS) authorizes the procurement and retention of your equipment, which is a function of base supply.

017. Equipment management system

The ~~AF equipment management program~~ is designed to provide a standard system of equipment management to all AF activities. The program allows the Air Force to determine, authorize, account for, and report the types and quantities of equipment needed to accomplish the AF mission. It also serves as a primary basis for organizational equipment budget/buy programs. The ~~EMS~~ is responsible for the timely support of maintenance activities, the adequate control of equipment, the maximum use of this equipment, and economy of operation.

Property custodians

Each supply contact will be a squadron, branch, or section property custodian. The custodian serves as the ~~EMS~~'s representative for your account. The custodian may be a commissioned officer, noncommissioned officer (NCO), Airman, or civilian. Whenever possible, the property custodian should be someone in a supervisory capacity. As you progress in your career, you may be appointed the property custodian or assistant custodian for your shop or section. You will make equipment requests through your unit property custodian to obtain new equipment authorization, and in some cases, you will obtain your expendable supplies through this person.

Special purpose recoverable authorized maintenance account

The SPRAM account is a special account set up to assist maintenance in accomplishing their mission. Assets within a SPRAM account are identified as expendability, reparability, and recoverability code (ERRC) XD items. These items are expendable depot-funded assets. Maintenance personnel use them for a variety of reasons. Some are detecting/isolating faults, calibrating/aligning equipment, simulating an active system installed on an aircraft, and conducting AETC courses. The SPRAM assets you are concerned with are the items listed in your aircraft's –21 series TO. These assets are commonly referred to as –21 equipment or AME. It includes pylons, bomb racks, missile launchers, and so forth.

018. Allowance standards, equipment authorization inventory data, custodian authorization/custody receipt listings

Included in the supply world are such items as the allowance standard (AS), the equipment authorization inventory data (EAID), and the custodian authorization/custody receipt listing (CA/CRL). Let's look at each.

Allowance standard

AF equipment AS documents prescribe the items and quantities an organization or individual is authorized and needs to perform its assigned missions, functions, and/or duties. The allowance documents list the latest standard-preferred equipment. Tentative standard or alternate standard items

are not listed if there is a standard item that meets the requirement. Allowance documents list only nonexpendable items; certain items are exempted from this policy though. Exempted items include equipment such as hand tools, individual issue items, and components of bench sets. Spare parts you expend in maintaining, repairing, or assembling equipment are not included in allowance documents.

Equipment authorization inventory data

EAID is the record of nonexpendable (you cannot dispose of it) equipment accounted for by the chief of supply. Your entire unit's AS authorizations, as well as every other unit on base, are shown on the EAID. The EAID shows what and how much accountable equipment you are authorized. Your account must have either on-hand or on-order all items shown on the EAID. If you turn an item back in to the EMS by using an AF Form 601, Equipment Action Request, it will be removed from the EAID.

Custodian authorization/custody receipt listing

The CA/CRL is a computer listing showing all authorizations, assets, and due-outs (items on order) for each custodian by organization code and shop code. Items on this list are in authorized and preferred stock number sequence. The custodian uses CA/CRL to inventory and account for all EAID property for which he or she is responsible. The listing shows stock number, nomenclature (name), authorizing AS, quantity authorized and on hand, and, if any, quantity due-out (on back order). The dollar value is shown for each item as well as the total account value.

019. Purpose of the supply classification system

The millions of items in the supply system are identified under a supply classification system. The purpose of this system is to allow all branches of the armed forces, as well as any US government agency or North Atlantic Treaty Organization (NATO) country the ability to order the same item of equipment under a common national stock number (NSN).

Defense Logistics Agency

Have you ever wondered who exactly buys all of the parts we use? As America's combat logistics support agency, the Defense Logistics Agency (DLA) provides the Army, Navy, Air Force, Marine Corps, other federal agencies, and combined and allied forces with the full spectrum of logistics, acquisition, and technical services. The agency buys and provides nearly 100 percent of the consumable items America's military forces need to operate, from food, fuel and energy, to uniforms, medical supplies, and construction and barrier equipment. DLA also supplies more than 80 percent of the military's spare parts. As a global enterprise, wherever the United States has a military presence, DLA is likely there as well. So in order for the AF supply system to operate, DLA must first procure the parts. For more information, refer to the DLA website at www.dla.gov.

Supply system

This system is comprised of a standard classification arrangement of items and parts by groups and classes. The federal supply classification (FSC) includes approximately 76 groups, which are further divided into more than 560 classes. Each group covers a broad area of commodities, whereas each class covers a relatively homogeneous area of commodities.

The NSN identifies each item in the supply system. An NSN is a 13-digit stock number made up of the 4-digit FSC code and a 9-digit national item identification number (NIIN). The FSC code consists of a group and a class code (mentioned above), each having two digits. For example, group 80 includes all types of brushes, paints, and adhesives. Class 8010 would be the class within that group of all types of paints. In the listing below, you will find several supply groups that you will have occasion to reference when ordering parts or equipment:

- Group 10 – Weapons.
- Group 11 – Nuclear.

- Group 13 – Ammunition and Explosives.
- Group 14 – Guided Missiles.
- Group 15 – Airborne Equipment.

Of these, you will most often use Group 10–Weapons. The first part of the NIIN consists of the two-digit National Codification Bureau (NCB) code of the nation assigning the stock number. The NCB codes assigned to the United States are 00 and 01. The remainder of the NIIN is the specific supply item identification number, consisting of a seven-digit stock number representing the particular item. All of these numbers put together make up the NSN. NIIN 00–598–5058 within group/class 8010 represents the 1 quart–size container of bright red enamel. In this example, the NSN would be:

FSC	+	NIIN	=	NSN
8010	+	00-598-5058	=	8010-00-598-5058

020. Methods and forms used to issue supplies

As with all systems, supply has its paperwork. We'll now take a look at the common supply documents and forms.

Issue of supplies

The initial issue of supplies and equipment is based on proper justification. Authorization documents, established stock levels, special projects, special authorities, special orders, and other publications are examples of justification cited to justify the issue. Using organizations obtain expendable items directly from base supply issue points. The issue points may be in the form of a base service store, bench stock, or supply point. For our example of an issue point, let us see how bench-stock procedures are used to obtain stock items.

Expendable supplies may be requested by radio, telephone, through IMDS, mail, or in person. The AF Form 2005, Issue/Turn-in Request (fig. 3–10), is used to issue/turn-in supplies on bases or deployed locations with mechanical accounting. Alternately, requests can process via electronic means through IMDS where available. An explanation of the entries on these forms is not within the scope of this course. These entries may vary from base to base; therefore, you should check with your customer liaison at base supply for proper procedures for filling out these forms.

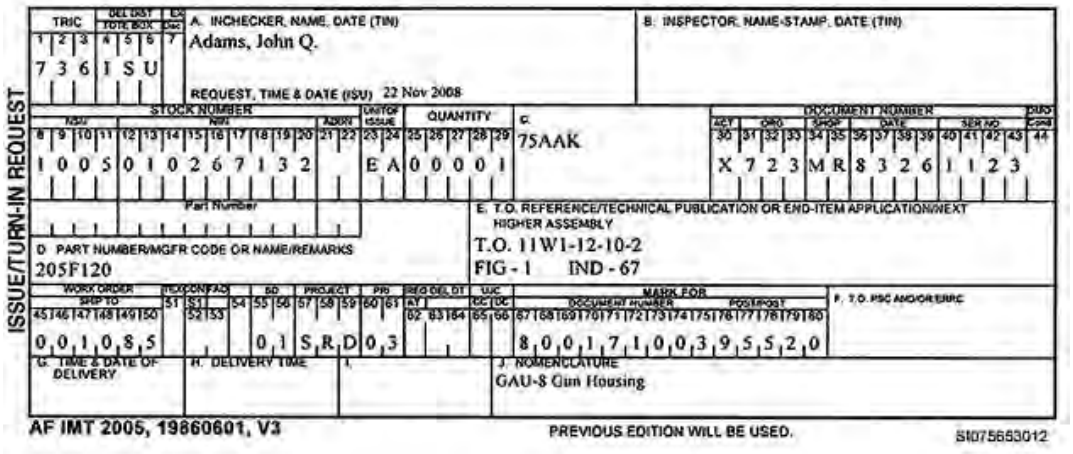


Figure 3–10. AF Form 2005.

These issue requests are sent to demand processing (supply), bench-stock support section, supply point, or retail sales section (individual equipment, base service store, local purchase), as applicable. Base supply issues items on hand on a priority basis (with priorities numbered 01, 02, 03, or 04). Priorities 01 and 02 are delivered within 30 minutes, 03 within 1 hour, and 04 within 4 hours. Lower

priorities (higher numbers) are issued on a routine basis. If the item you need is not on hand at supply, your request is back-ordered and supply reorders the item from a depot or General Services Administration (GSA) source. When the item is received at base supply, it is delivered to your shop using the same priority system as above. Confirmation of your supply requests/activities is shown on a computer listing called a D04, Daily Document Register. Check this tool as soon as possible after your request to determine the status of the item you need. ~~Further guidance on supply procedures may be found in AFMAN 23–110, Vol. 2, Part 13, *Standard Base Supply Customer's Procedures.*~~

IMIS parts ordering process

The parts ordering application in the IMIS system is an integrated means of requisitioning parts required for a job. The parts ordering application (fig. 3–11) displays data stored in the IMIS database (equipment maintenance) and (parts order) tables. The application allows the user to supplement the initial parts order information and then initiate a parts order through IMDS. After the order is initiated, the parts order status is then sent by IMDS. The part status and additional job control functions are available in the parts ordering application. Access to the parts ordering application is through IMIS desktop or present TO.

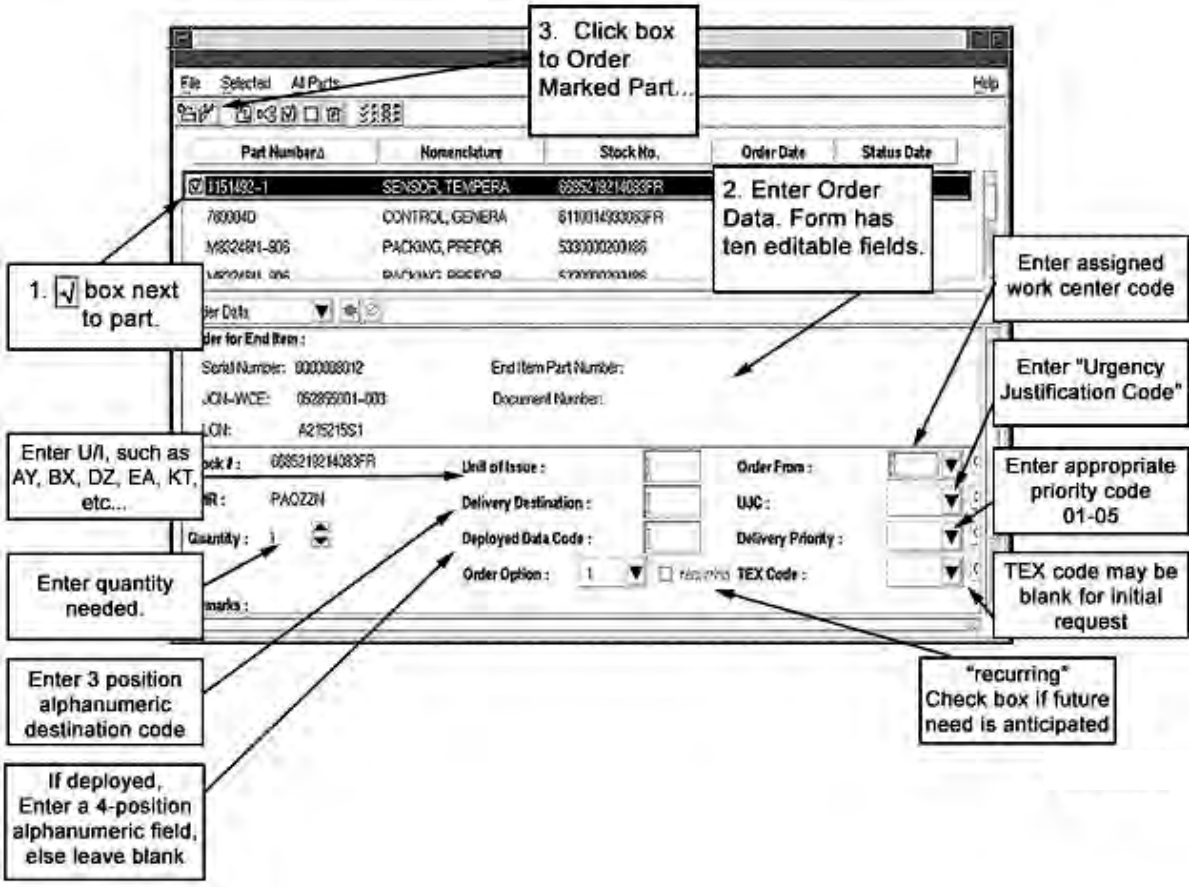


Figure 3–11. IMIS parts ordering application.

The data used by the parts ordering application is initially populated by the present TO application. This occurs when, after selecting the desired part in the IPB window (fig. 3–12) or TO graphic hotspot (fig. 3–13), the user selects the parts ordering icon. Selecting the part order icon populates the part order table with the selected information. The part order is only sent to the IMDS queue from the parts ordering application. This information is then sent to the appropriate agency at base supply in order to process the required part and deliver it to the maintainer. In response, IMDS sends IMIS the

status of the part ordered. The part order information is automatically entered in the appropriate field in the aircraft forms.

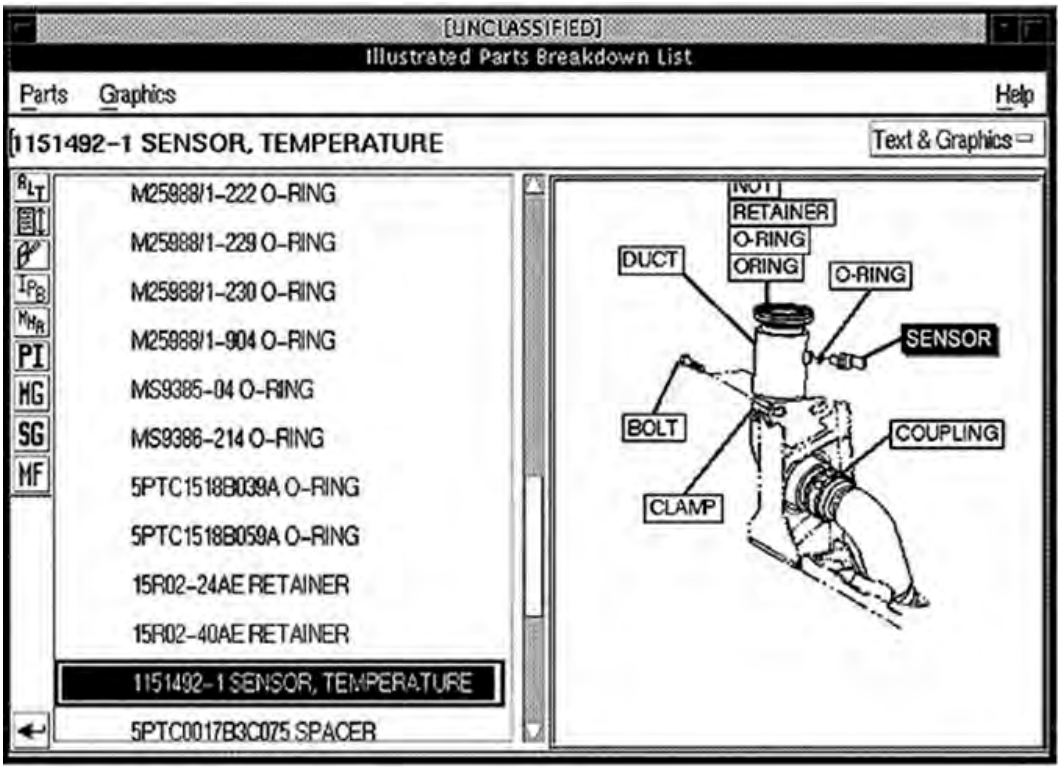


Figure 3–12. IMIS IPB.

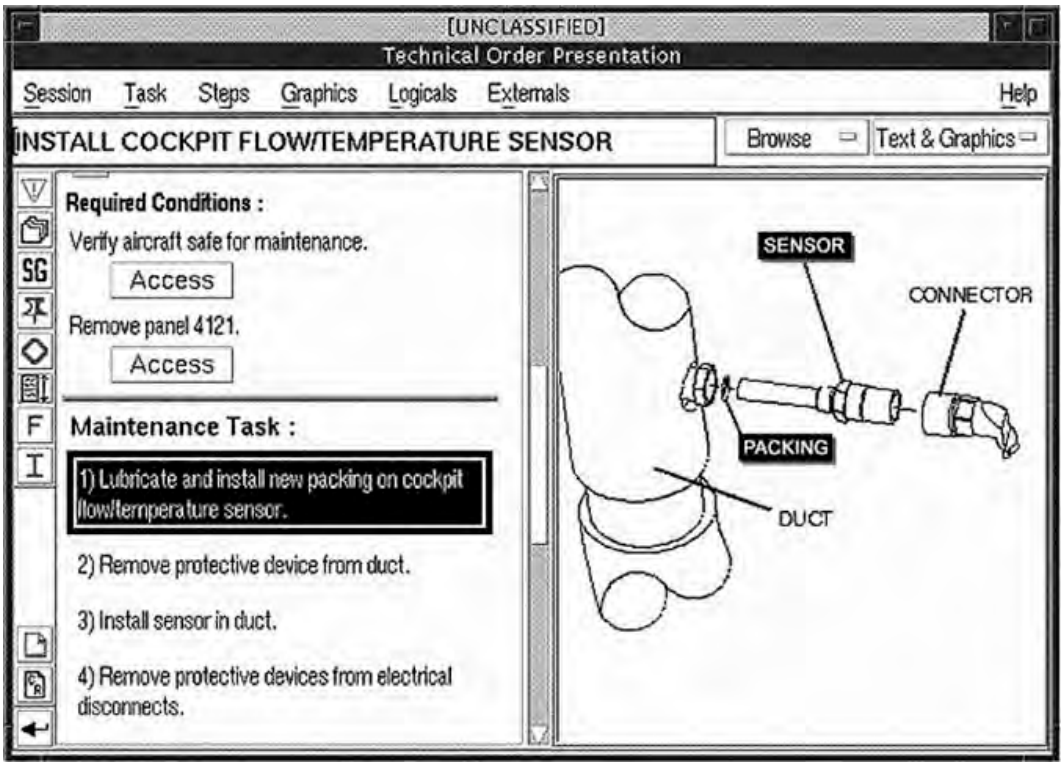


Figure 3–13. IMIS TO graphic hotspot.

If operating with a wireless-enabled PMA, the whole process can be performed at the aircraft. Theoretically, the only time the maintainer would have to leave the aircraft would be to pick up the repair part in his or her support section.

021. Control and processing of repair cycle assets

The primary objective of the repair asset control system is to bring about the economy of spares procurement through effective management of assets.

Repair cycle asset control

A repair cycle asset is an item with the ERRC designator code XD or XF. For these items, base supply provides maintenance with a due-in from maintenance (DIFM) notice, DD Form 1348–1, DOD Single Line Item Release/Receipt Document. An AFTO Form 350, Reparable Item Processing Tag, is required when a repair cycle asset is removed from an end-item and when items require bench check and/or repair. Base supply accumulates repair cycle data from information recorded on the AFTO Form 350, Part II. This information is used in the computation of base stock levels. Documentation pertaining to intermediate maintenance actions on AFTO Forms 350 regarding bench check, reparable this station (RTS), NRTS, and condemnation must be accurate to ensure effective control of repair cycle assets.

A demand on supply for a repair cycle item results in a requirement for DIFM control of the asset. Control of repair cycle assets within intermediate maintenance is accomplished through operation of a reparable processing center (RPC). Consolidation of the RPC with the repair cycle support unit of base supply establishes a reparable asset control center (RACC).

Repair cycle assets are considered part of the base stock level, whether serviceable or reparable; therefore, positive controls must be established for processing these items. Base supply, when issuing a repair cycle asset, prepares a DIFM notice (DD Form 1348–1) for use by maintenance personnel in identifying and controlling repair cycle items. The DIFM notice, together with the AFTO Form 350, Part II, provides a means for controlling reparable items as they pass through the reparable process.

The RPC DIFM monitor maintains a continuous check of the suspense portion of the DIFM notice file. This monitor also reviews the DIFM listing daily to ensure reparable items are promptly processed into repair channels, to prevent DIFM delinquencies, and to ensure the location of each DIFM asset is known.

Internal control within the maintenance action is accomplished through use of the AFTO Form 350. The maintenance technician who removes the reparable item fills out the form. The supply document number furnished by base supply is entered in block 13 of the AFTO Form 350 by the technician who completes the form. This number is used to connect the DIFM document with the AFTO Form 350.

Repair cycle asset processing

Using a single integrated processing system controls serviceable and reparable assets. When a demand is made on the supply system, base supply delivers the repair cycle asset to the specific location. The individual receiving the item signs and prints his or her name on the DD Form 1348–1. The supply representative gives the signer/receiver copy 2, delivers copies 3 and 4 to RPC or the DIFM monitor, and returns copy 1 to the document control section of base supply.

An AFTO Form 350 is initiated for and attached to the reparable item. Copy 2 of the DD Form 1348–1 is attached to the AFTO Form 350. The reparable item is then sent to RPC for repair. The production control scheduler schedules the item into the maintenance shop for repair. The shop completes the AFTO Form 350 to document the repair action taken. The 350 is completed when shop action is complete. The repair cycle asset and its documentation are then returned to the RPC or turn-in to base supply.

022. Principles of nuclear certified equipment

The AF Nuclear Certification Program ensures all procedures, equipment, software, facilities, personnel, and organizations are certified before conducting nuclear operations with nuclear weapons or nuclear weapons systems. HQ Air Force Safety Center is the approval authority for safety design certification. The AF Nuclear Weapons Center is responsible for listing certified items and usage restrictions on the Internet-based Master Nuclear Certification List (MNCL). Much analysis and testing goes into the design and development of nuclear-certified equipment (NCE) to meet nuclear surety requirements. Make sure you are using *authorized equipment* before you perform operations with nuclear weapons. Use the MNCL to verify your equipment is nuclear certified.

Nuclear Certification Program

Nuclear certification occurs when a determination is made by the Air Force that procedures, equipment, software, and facilities are sufficient to perform nuclear weapons functions and personnel and organizations are capable of performing assigned nuclear missions. Nuclear certification is required before a nuclear weapon system or item of equipment can be used to support unit nuclear mission tasking.

Nuclear-certified items

A nuclear certified item (NCI) is defined as procedures, equipment, software, facilities, systems, subsystems, or components which are nuclear certified. Only NCIs may be used in nuclear operations. NCIs include aircraft components and suspension equipment (e.g., pylons, rotary launchers, bomb racks).

Nuclear-certified equipment

NCE is a subset of NCI that consists of support equipment, which is nuclear certified. NCE is defined as peculiar (i.e., system specific) and common specialized or nonspecialized support equipment whose design meets applicable design criteria and is nuclear certified in accordance with the nuclear-certification process and identifies on the MNCL. NCE includes vehicles; AGE; munitions material handling equipment; facility lifting and suspension equipment; test equipment; automatic test equipment; organizational, field, and depot equipment; and related computer software.

Let’s break this down a little further into specialized equipment, nonspecialized equipment, and support equipment. Specialized equipment refers to equipment designed specifically for use with nuclear weapons. Nonspecialized equipment is equipment used with nuclear weapons but not specifically designed for that purpose. Finally, support equipment includes all equipment required to perform the support functions, except that which is an integral part of the mission equipment. It does not include any equipment required to perform mission operation functions.

Master Nuclear Certification List

The MNCL identifies equipment, hardware, software, and facilities which are nuclear- or design-certified per AFI 63–125, *Nuclear Certification Program*. The MNCL is the sole authority for determining the certification status of NCI and NCE. It is a web-based database which can be accessed from https:wwwmil.nwc.kirtland.af.mil/mncl/index.cfm. This database provides users the nuclear certification status of weapon systems, subsystems, components, software, support equipment, and facilities. Users of the MNCL should check both the specific item listing as well as the general guidance section of the MNCL to determine the certified status and usability of NCI and NCE. Changes to the MNCL are accomplished only after evaluation by the proper engineering command according to AFI 91–103, *Air Force Nuclear Safety Design Certification Program*. Deficiencies discovered on items listed are reported according to AFMAN 91–221, *Weapons Safety Investigations and Reports*.

It also defines common terms and lists certain items that do and do not require certification. The MNCL is an excellent tool that provides users with rapid updates and changes. Since the MNCL can change almost on a daily basis, we must check it more frequently than the old hard-copy TO.

Users are authorized to produce printed products from the MNCL to verify certification status when the printed product is validated by:

- Comparing the print date of the locally produced printed document to the "Last Update" date on the "Main Menu" page of the MNCL. If the print date is newer than the "Last Update" date in the MNCL, the printed product is valid.
- If the "Last Update" date is newer than the print date, the locally produced printed product can be validated by:
  - Attaching the current "Summary of Changes" to the locally produced printed product to show no items have been affected by updates since the print date on the printed product. The "Summary of Changes" must encompass the entire date range from the printed product to the "Last Update" date on the MNCL.
  - The MNCL does have an automatic search function, which allows you to enter nomenclature or NSN to find equipment and also has a function to allow you to just search for recent changes.

Positive identification of nuclear certified equipment

Before you use any test and handling (T&H) equipment with nuclear weapons systems, first verify it using the MNCL. *If the piece of equipment is not listed, do not use this equipment with nuclear weapons systems*. Make positive ID by a nameplate, label, or appropriate markings or by historical documents. If all exist, only the nameplate, label, or appropriate markings need to be verified against the MNCL. If a discrepancy exists with any element of the item ID in the MNCL, the item is considered not certified until the discrepancy can be resolved. However, the absence of a data element on the nameplate or label, when all other identifying elements are correct, does not constitute a discrepancy. The MNCL is the sole authority for determining certification status. Therefore, certified items are not to be marked in any way, such as being stamped, etched, painted, or similarly marked on the item structure or data plate to show that it is nuclear certified. Nuclear load restrictions may be marked where appropriate, but you cannot use the marking to verify certification status.

Modifications

Modifications include all physical and/or functional configuration changes or new uses to existing nuclear design certified items. AF policy requires all modifications to certified items be identified to the ALC item manager. According to AFI 91–103, *Air Force Nuclear Safety Design Certification Program*, minor modifications to nonspecialized equipment (e.g., trucks, semi-tractors, trailers, hoists, and cranes) may not require formal certification, providing the equipment is still used for its original purpose and the modifications do not impact the item's primary structure, electrical and hydraulic power systems, load bearing capacity, steering and braking capability, or positive control features. Changes must be approved by the operational MAJCOM. Do not perform any modifications to NCE without proper approval.

Test and handling equipment, software, and tools

These AF equipment items require nuclear certification:

- All AF equipment used to lift, hoist, mate, support, store, restrain, tow, transport, or otherwise handle complete nuclear bombs or warheads.
- Individual bomb roller assemblies if they are listed as an authorized accessory in applicable, approved technical data and are in original, unmodified condition.
- Test equipment used to test and verify the proper functioning of critical circuits, assemblies, and devices associated with nuclear bombs and warheads in all nuclear weapons systems.

- Tie-down chains, adjusters, straps, load binders, and shackles used for weapon restraint during transportation are nuclear certified provided they are in original, unmodified condition. (**NOTE:** Individual restraint items are only listed in the MNCL if a remark is stated or a restriction is imposed. Therefore, check individual ID information for all restraint devices in the MNCL to determine if any remarks and/or restrictions are applicable.)
- Software used to command and control critical functions and perform status reporting.
- Test software used to verify the proper functioning of the authorization, pre-arm, arm, unlock, release, or launch circuits of a combat delivery vehicle or that directly interfaces with weapons and/or operationally certified critical components.
- Special test or certification equipment used to operationally certify a critical component.
- Original pintle hooks (authorized, as are replacements) if procured and installed per appropriate TOs.

These AF equipment items do *not* require nuclear certification:

- Test equipment used only to test, troubleshoot, and calibrate critical test equipment.
- Common purpose and nonspecialized test equipment (e.g., multimeters, igniter circuit testers) do not require certification unless the equipment directly interfaces with nuclear weapons or is part of an end-item that is nuclear safety design certified.
- General and special-purpose hand tools, such as manually operated hydraulic floor or pallet jacks, wheeled pry bars (J-Bars), pliers, wrenches, vacuum cleaners, screwdrivers, measuring tools, magnifiers, connector removal and/or pin straightening tools, and so forth.
- Equipment designed and used for proficiency training, such as practice delivery bombs, practice loading bombs and warheads, and training re-entry vehicles and payload sections.

Applicability

One of the most common misconceptions involved with the MNCL program is that it is not applicable to units that do not have a nuclear mission. This is untrue. The fact that your unit may not have a nuclear mission is irrelevant. If your unit possesses any equipment listed on the MNCL, then it applies to you; lift trucks, forklifts, testers, and tools are all equipment common across the aircraft armament system career field. The vast majority of people reading this right now have MNCL-listed equipment in their work place.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

016. Expendable and nonexpendable supplies

1. Define expendable supplies.

2. How many days are bench-stock supplies stocked?

3. What are nonexpendable supplies?

017. Equipment management system

1. State the responsibilities of ~~equipment management system.~~

2. A property custodian should be what, whenever possible?

3. What is a SPRAM account?

018. Allowance standards, equipment authorization inventory data, custodian authorization/custody receipt listings

1. What document authorizes the equipment used by an organization?

2. What is an EAID?

3. What document does the custodian use to keep track of assigned EAID property?

019. Purpose of the supply classification system

1. What is the purpose of the federal supply classification system?

2. Explain the composition of a NSN.

020. Methods and forms used to issue supplies

1. Which AF form is used for the issue of supplies?

2. How are expendable supplies requisitioned?

021. Control and processing of repair cycle assets

1. What is the primary objective of the repair cycle asset and control system?

2. What is a repair cycle asset?

3. From the following list, circle the repair cycle assets.

   (a) Water drain valve XF–2.
   (b) Tube XB–3
   (c) Test Set ND–2
   (d) Wire XB–2.
   (e) Circuit boards XF–3.
   (f) HD–406 XD–1.
   (g) Turbine bucket XF–3.
   (h) Tire XD–2.

4. What documents are used to control a DIFM item through the repair cycle?

5. To whom are copies 1, 2, 3, and 4 of the 1348–1 distributed?

022. Principles of nuclear certified equipment

1. When does nuclear certification of an item occur?

2. What is the difference between NCI and NCE?

3. What identifies equipment, hardware, software, and facilities which are nuclear or designed certified according to the Nuclear Certification Program?

4. What action must you take if a discrepancy exists with any element of the item identification in the MNCL?

5. Who must certify the modification of MNCL certified items?

6. To which units do the rules surrounding the MNCL apply?

3–3. Supply Discipline

Money is a concern for most of us. We all have to stretch it out and make ends meet. In this segment, we discuss ways to save money for the Air Force and ourselves at the same time.

To carry out the Air Force mission, we buy many thousands of items, spare parts, and special tools. The cost runs into billions of dollars. This property is stored, issued, reissued, or shipped. This cycle may be repeated several times before an item is no longer usable and sold for scrap. At this very moment, there are reparable items in your section. They need to get back into the supply pipeline. It is your responsibility to help get this done.

023. Principles of supply discipline and public property responsibility

All AF personnel are responsible for government property just as if it were their own. This applies to officers, Airmen, and civilians alike. When you use a piece of government property, it is like borrowing a book from the library. Eventually, you must return it.

Principles of supply discipline

It is important you clearly understand your responsibility for government property. If you fail in this responsibility, there may come a time when the Air Force will ask you to pay for a piece of equipment. Even though your tax money has already helped to buy it, you may have to pay for it again, and you don't even get to keep it. Your knowledge of the rules and procedures may relieve you of the monetary responsibilities for damage or loss. Public property laws passed by Congress established the lines of responsibility for government property placed in a person's care.

Good business practices are important. Obtaining more supplies than you need for the mission of your organization is not a good business practice. You normally do not buy four additional tires as spares for your automobile merely because it has four wheels and the tires were on sale. Neither is it necessary to buy a spare engine, because the original engine should run for more than 100,000 miles. These same principles apply to buying supplies for the Air Force. We call these business practices, the "principles of supply discipline."

When was the last time you heard of someone buying just one nail? Generally, small items come in boxes containing multiple pieces. The way to identify this is by being aware of unit of issue (UI) listing when ordering parts. Unit of issue refers to the amount of items that come packaged together when ordered. If you only need one part out of a box that contains many, it's your responsibility to return the remaining items into the supply system for use in the future.

Another example of poor supply discipline is the misuse of the priority designator system when ordering parts. Everyone would like to get their parts faster, but the priority system is in place to reflect the actual needs of the Air Force and its mission, not any particular maintainer's needs or wants. Misuse of the priority system creates unnecessary additional costs in the handling of parts.

Responsibility for public property

Policy dictates the person who is using the property is responsible for its care. Everyone in the Air Force is responsible for some type of property. For one person, it may be a shop full of equipment; for another, a bed blanket. In any case, property responsibility is a common obligation of all AF personnel.

024. Command, supervisory, and custodial responsibilities

Have you ever thought about the value of the equipment you will be entrusted to use on a daily basis? The American taxpayer deserves the highest level of care with his or her property. To do this we have a custodial responsibility system and the supervisory structure that ensures it is followed.

Command responsibility

Each commander has ultimate responsibility for all property under his or her jurisdiction. Commanders are not exempt from liability for loss, damage, or destruction of government property within their command.

A commander must ensure records of supply transactions are kept accurately. To fulfill this duty, the commander must rely upon the capabilities of the people in his or her command. Commanders must know the records to be maintained and the procedures used to accomplish this responsibility. It would be almost impossible for commanders to know all the minute details required for recordkeeping. They must ensure the people assigned to recordkeeping positions are trained and are trustworthy. To ensure economical use, commanders must also make sure supplies are used for their intended purposes and are not wasted.

Supervisory responsibility

Supervisors are often given the responsibility to direct and control equipment and supplies because they are normally responsible for property located within their work area. Although they may not have as many responsibilities as commanders, they have more direct control over the property. Supervisory responsibility applies to any person who exercises supervision of the property. The property may be received, in use, in transit, in storage, or undergoing modification or repair.

Custodial responsibility

The word “custodian” means caretaker. Custodial responsibility is responsibility assumed when a person takes physical possession of government property. Custodians are personally responsible for such property if the property is: (1) issued for their official or personal use, whether or not they have signed receipts for the property; (2) under their direct control for storage, use, custody, or safeguarding; or (3) found (indicating possible loss, theft, or abandonment) under circumstances requiring their personal care, custody, or protection. An individual who has acquired physical possession of government property must assume custodial responsibility.

Property issued to an individual does not become private property by the act of issue (regardless if the issue was for official or personal use). It remains public property and, as such, must be safeguarded adequately.

025. Relief from command, supervisory, and custodial responsibility

What happens to your property responsibility as you move from base to base? You cannot be held responsible for equipment that is located at a previous base, right? What are the procedures for relieving yourself of these responsibilities?

We have mentioned how property responsibility is assumed. Now, there are two ways of being relieved of the responsibility for government property—turn-in and transfer.

Turn-in

The turn-in of property means putting it back into the supply channels. If the property is not serviceable, it is transferred to a repair activity. Serviceable items are turned in for reissue. If you have an item on your CA/CRL and you don’t need it, turn it in. The EMS processes the paperwork and base supply sends someone to pick up the equipment. It is put back into the supply system so it can be requisitioned by another organization, somewhere in the world, if it is needed.

Transfer

The transfer of property, as used here, means changing its physical location or user. If the user of the property changes, custodial responsibility moves to the new user. Again the EMS section handles the transfer of items to another organization and changes responsibility to the gaining organization.

026. Report of survey

Inevitably, there comes a time when equipment or materials are lost or damaged. Let's cover the procedures used for the report of survey.

Purpose

A report of survey is an instrument used for explaining and recording the circumstances involved in the loss, damage, or destruction of AF property. It supports the removal of property from your records, serves to resolve the questions of responsibility for loss, and it affixes liability.

Process

Preparing the report of survey form is the first step in the report of survey process. The individual who has custodial responsibility for the property at the time of loss starts the process. Since the report of survey is a means for explaining the loss, damage, or destruction of government property, the responsible individuals should include all pertinent facts and circumstances surrounding the loss. Remember, the information on the report of survey is the basis for deciding whether an investigation is necessary. Reports of survey must be initiated and processed within 30 days of the date the loss was discovered. The investigation must be made while the persons involved, including witnesses, are available and facts are still fresh. After the report has been completed, it goes to the base-appointed authority for review and appropriate action. If the report of survey is approved, the individual is relieved of the responsibility for the equipment. He or she need not reimburse the Air Force for the cost of the item. However, if the authorities decide the individual was negligent, he or she has to reimburse the Air Force.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

023. Principles of supply discipline and public property responsibility

1. Who is responsible for care of the equipment you use in your job?

2. What authority is used to hold military members accountable for public property under their control?

024. Command, supervisory, and custodial responsibilities

1. Who is responsible for ensuring records of supply transactions are kept accurately?

2. Why is the supervisor often given the responsibility of control over equipment and supplies?

3. What is custodial responsibility?

4. Under what conditions do you assume custodial responsibility for AF equipment?

025. Relief from command, supervisory, and custodial responsibility

1. What are the two ways an individual can be relieved of responsibility of government property?

2. The flight NCOIC wants his or her personnel to turn in unserviceable parts as soon as possible. Give the reasons for this action.

026. Report of survey

1. What is the purpose of the report of survey?

2. Who prepares a report of survey?

3. What is the longest time, after a loss is discovered, a report of survey must be initiated?

Answers to Self-Test Questions

011

1. To store maintenance data needed by MAJCOMs, HQ USAF, AFMC, and other agencies to manage and track maintenance resources worldwide.
2. IMDS makes use of a GUI displayed on standard personal computers. The GUI is a Windows-style point-and-click format that provides access to the IMDS screens via the Internet.

012

1. The MSU.
2. The CDE.
3. The PMA.

013

1. After a follow-on OT&E of equipment.
2. It provides data to managers at base level, to management at intermediate and major command headquarters, and to the AFMC to handle materiel management and logistic support requirements.
3. AFMC.
4. You should have listed all of the following:
   (1) Identifies equipment problems from an AF-wide standpoint and initiates actions to improve equipment.
   (2) Evaluates inspection and time change requirements based on usage of spares in the field.
   (3) Maintains the status of TCTO accomplishments.
   (4) Determines spares requirements based on the usage of spares in the field.
   (5) Analyzes items reported NRTS.
   (6) Maintains accurate configuration, and stockpiles knowledge of each weapon.

014

1. Used to document each discrepancy discovered by the pilot or maintenance personnel and to document any corrective action taken to correct a discrepancy.
2. AFTO Form 781K.
3. Through an icon on the IMIS desktop.

015

1. Significant maintenance actions on end-items. The type of information found on this form pertains to modifications, malfunction history, and so forth of particular end-items.
2. On AGE and certain pieces of test equipment.
3. To expedite maintenance operations and indicate equipment status.
4. (a) Used to indicate the identity and serviceability of property received, stored, and issued by the USAF.
   (b) Used to identify materiel in stock that has been suspended for issue, items returned to supply that are suspended from issue, and items on record that have been turned over to a maintenance facility or a contractor.
   (c) Indicate that the item is unserviceable and uneconomical to repair or the TCTO directs its condemnation.
   (d) Indicate if an item or component is repairable.

016

1. Items that are either consumed in use or they become part of another assembly.
2. 30, 45, or 60 days.
3. Tables, chairs, trucks, testers, and power units.

017

1. The timely support of maintenance activities, the adequate control of equipment, the maximum use of equipment and economy of operation.
2. Someone in a supervisory capacity.
3. A special account to assist maintenance in accomplishing their mission.

018

1. AS.
2. The record of all nonexpendable equipment accounted for by the chief of supply.
3. CA/CRL.

019

1. The classification system is a standard classification for items and parts. It provides a common NSN, whereby all components of the Armed Forces, along with the government agencies and NATO countries, can order the same item under a common number.
2. A 13-digit number made up of the 4-digit FSC code and a 9-digit NIIN.

020

1. AF Form 2005.
2. Expendable supplies may be requested by radio, telephone, through IMDS, mail, or in person. The AF Form 2005 is used on bases with mechanical accounting. Alternately, requests can processed via electronic means through IMDS.

021

1. To bring about economy of spares procurement through effective management of assets.
2. An item with the ERRC designator code XD or XF.
3. a, e, f, g, h.
4. DD Form 1348–1 and AFTO Form 350, Part II.
5. (1) Copy 1 of the 1348–1 goes back to document control section of base supply.

(2) Copy 2 of the 1348–1 stays with the individual who signs for and receives the item.

(3) Copies 3 and 4 of the 1348–1 go to RPC or the DIFM monitor.

022

1. It occurs when a determination is made by the Air Force that procedures, equipment, software, and facilities are sufficient to perform nuclear weapons functions and personnel and organizations are capable of performing assigned nuclear missions.
2. A NCI is defined as procedures, equipment, software, facilities, systems, subsystems, or components which are nuclear certified. NCE is a subset of NCI which is defined as peculiar and common specialized or non-specialized support equipment that has been identified on the MNCL.
3. The MNCL.
4. The item is considered not certified until the discrepancy can be resolved.
5. The ALC item manager.
6. Any unit possessing any equipment listed on the MNCL.

023

1. All AF personnel are responsible for government property just as if it were their own.
2. Public property laws passed by Congress.

024

1. The commander.
2. Because he or she is normally responsible for property located within his or her work area.
3. Responsibility assumed when a person takes physical possession of government property.
4. Custodial responsibility must be assumed by those who use, issue, find, safeguard, and transport AF property.

025

1. Turn-in and transfer.
2. By turning in the unserviceable items back into the supply channels, the items can be transferred to a repair activity, and reissued to another organization.

026

1. It explains and records circumstances involving lost, damaged, or destroyed AF property.
2. The individual who has custodial responsibility at the time of loss.
3. No later than 30 days.

Complete the unit review exercises before going to the next unit.

Unit Review Exercises

Note to Student: Consider all choices carefully, select the *best* answer to each question, and *circle* the corresponding letter.

42. (011) Which system's purpose is to store maintenance data needed by major commands and other agencies to manage and track maintenance resources worldwide?
    a. Core Automated Data System.
    b. Integrated Maintenance Data System.
    c. Core Managed Logistics Data System.
    d. Core Automated Maintenance System.

43. (011) Integrated Maintenance Data System (IMDS) "pick lists" reduce the number of failed transactions by providing
    a. only valid data for the user to select.
    b. all possible data for the user to select.
    c. interactive, real-time assistance to the users.
    d. reduced user control options to only those applications likely for use in the context of a given application mode or sub mode.

44. (011) Integrated Maintenance Data System (IMDS) screens are oriented by
    a. task.
    b. equipment.
    c. item part number.
    d. item national stock number.

45. (012) What aircraft are supported by the Integrated Maintenance Information System (IMIS)?
    a. F–22 only.
    b. All aircraft.
    c. B–2 and F–22.
    d. Nuclear capable aircraft.

46. (012) What is the central component of the Integrated Maintenance Information System (IMIS)?
    a. Maintenance server unit (MSU).
    b. Portable maintenance aid (PMA).
    c. Integrated Maintenance Data System (IMDS).
    d. Core Automated Maintenance System (CAMS) mainframe.

47. (012) To select an application on the Integrated Maintenance Information System (IMIS) desktop, the user can tab through the applications or
    a. enter the desired screen number.
    b. select application using the mouse.
    c. enter the selected applications URL.
    d. choose the application from the drop-down menus.

48. (012) What device is used to display technical manuals used on the F–22?
    a. Portable digital assistant.
    b. Maintenance server unit.
    c. Portable maintenance aid.
    d. Maintenance data retrieval aid.

49. (012) How does the portable maintenance aid (PMA) interface directly with the F–22?
    a. Wirelessly.
    b. Through a docking cradle.
    c. Through PMA connection ports.
    d. It does not directly interface with the aircraft.

50. (012) How many times a day must the portable maintenance aid (PMA) be docked to the maintenance server unit (MSU) to ensure the most *up-to-date* information is available to all users?
    a. Weekly.
    b. Once daily.
    c. Multiple times during the day.
    d. It does not directly interface with the MSU.

51. (013) The maintenance data collection (MDC) system is designed as a tool
    a. solely for spare parts procurement.
    b. for the management of maintenance resources.
    c. for the tracking of disciplinary action on maintainers.
    d. for procuring the most recent technology for the maintainer.

52. (013) Which major command (MAJCOM) depends on maintenance data collection (MDC) from all Air Force organizations maintaining the types of equipment the Air Logistics Center (ALC) provides support?
    a. Air Combat Command.
    b. Air Force Space Command.
    c. Air Force Material Command.
    d. Air Force Operations Command.

53. (013) What is initiated by the Air Logistics Center (ALC) when an equipment problem is indicated by the maintenance data?
    a. An emergency action notice.
    b. A time compliance technical order (TCTO).
    c. A technical order data change request.
    d. AFTO IMT Form 22, Technical Manual Change Recommendation Form.

54. (014) Which Air Force technical order (AFTO) form is used to document each discrepancy discovered by the pilot or maintenance personnel and to document any corrective action you complete to correct a discrepancy?
    a. 781A.
    b. 781H.
    c. 781K.
    d. 781R.

55. (014) Which aircraft form is *primarily* used to document calendar item inspections and delayed discrepancies?
    a. 781A.
    b. 781H.
    c. 781K.
    d. 781R.

56. (014) What is the *primary* form used to list all the jobs to be completed for the day and the technicians performing the task?
    a. AF IMT 2434.
    b. AF IMT 2430.
    c. AFTO Form 781A.
    d. AFTO IMT Form 95.

57. (015) Which Air Force technical order (AFTO) is used for maintaining a permanent history of significant maintenance actions on end items?
    a. AFTO Form 95.
    b. AFTO Form 244/245.
    c. AFTO Form 350.
    d. AFTO Form 781A.

58. (015) Which Air Force technical order form is used to document information and maintenance actions pertaining to aerospace ground equipment (AGE)?
    a. AFTO Form 350.
    b. AFTO Form 781A.
    c. AFTO IMT Form 95.
    d. AFTO Form 244/245.

59. (015) Which condition tag is used to identify *unserviceable (condemned)* material?
    a. DD Form 1574 (gold).
    b. DD Form 1575 (brown).
    c. DD Form 1577 (red).
    d. DD Form 1577–2 (green).

60. (016) What term is used to identify items that are required on a recurring basis within the near or immediate work area?
    a. Scrounge.
    b. Consumables.
    c. Bench stock supplies.
    d. Demand processing unit supplies.

61. (017) What section of supply is responsible for the adequate control and *maximum* use of equipment?
    a. Bench stock.
    b. Base service stores.
    c. Demand processing.
    d. Equipment management.

62. (017) What is the purpose of a special-purpose recoverable authorized maintenance (SPRAM) account?
    a. For storage of XD items.
    b. For holding items for future use.
    c. To assist maintenance in accomplishing the mission.
    d. To store items for future placement on equipment or aircraft.

63. (018) The allowance standard (AS) prescribes the amount of
    a. manpower you are authorized.
    b. equipment you are authorized.
    c. man-hours your shop could expend.
    d. money your shop can spend per year.

64. (018) Which category of equipment is listed on the allowance standard (AS)?
    a. Usable.
    b. Expendable.
    c. Consumable.
    d. Nonexpendable.

65. (018) What is a computer listing showing all authorizations, assets, and due-outs (items on order) for each custodian by organization code and shop code?
    a. Allowance standard (AS).
    b. Nonexpendable equipment listing.
    c. Equipment authorization inventory data (EAID).
    d. Custodian authorization/custody receipt listing (CA/CRL).

66. (019) What 13-digit number is assigned to all items in the supply system?
    a. Part number.
    b. National stock number.
    c. Federal supply classification.
    d. National item identification number.

67. (019) The national stock number (NSN) is established by combining which two numbers?
    a. Part number and the federal supply classification.
    b. Part number and the national item identification number.
    c. Part number and the National Codification Bureau logistical class.
    d. National item identification number and the federal supply classification.

68. (020) Through what system does the Integrated Maintenance Information System (IMIS) order parts?
    a. Base information technology network.
    b. Integrated Maintenance Data System (IMDS).
    c. Core Automated Maintenance System (CAMS).
    d. National Codification Bureau Informational System.

69. (021) What is the *primary* objective of the repair cycle asset control system?
    a. Hold repair asset maintenance actions to a minimum level.
    b. Return as many repair cycle assets as possible to AFMC for depot maintenance.
    c. Bring about the economy of spares procurement through effective management of assets.
    d. Bring about the economic procurement of new parts as opposed to repairing unserviceable parts.

70. (021) Which Air Force technical order (AFTO) form, along with the Department of Defense (DD) Form 1348–1, is used to control a repairable item through the repair cycle?
    a. 469.
    b. 988.
    c. 350, Part I.
    d. 350, Part II.

71. (022) What is required before a nuclear weapon system or item of equipment can be used to support a unit’s nuclear mission tasking?
    a. Wing weapons manager authorization.
    b. Wing commander approval.
    c. Nuclear certification.
    d. Repair cycle asset.

72. (022) What document identifies equipment, hardware, software, and facilities which are nuclear certified?
    a. Master nuclear certification list.
    b. Unit committed munitions listing.
    c. Nuclear certification authorization list.
    d. Core automated maintenance system listing.

73. (022) Air Force policy requires all modifications to nuclear certified items (NCI) be identified to the
    a. Air Force career field manager (AFCFM).
    b. Air Logistics Center (ALC) item manager.
    c. Wing weapons manager (WWM).
    d. Quality Assurance NCOIC.

74. (023) What term refers to the amount of items packaged together when ordered?
    a. Unit of issue.
    b. Item set size.
    c. Issue quantity.
    d. Purchase quantity.

75. (024) Who has *ultimate* responsibility for all property under his or her jurisdiction?
    a. Caretakers.
    b. Custodians.
    c. Commanders.
    d. All Air Force members and civilian employees.

76. (025) What are two ways of being relieved of the responsibility for government property?
    a. Turn-in and recall.
    b. Turn-in and transfer.
    c. Turn-in and expenditure.
    d. Transfer and expenditure.

77. (025) What action is taken when unserviceable property is turned in?
    a. Item is destroyed.
    b. Report of Survey is generated.
    c. Item is transferred to a repair activity.
    d. Item is sent to the defense reutilization and marketing office.

78. (026) A report of survey is an instrument used to
    a. inventory a supply account.
    b. measure a supply section’s productivity rate.
    c. determine how effectively supply is meeting procurement needs.
    d. explain and record the circumstances involved in the loss of Air Force property.

79. (026) A report of survey must be initiated within how many days after the discovery of loss?
    a. 5 days.
    b. 10 days.
    c. 15 days.
    d. 30 days.

Please read the unit menu for unit 4 and continue ➔

Unit 4. Inspection, Materiel Deficiency, and the Air Force Technical Order System

WHY NOT PREVENT MALFUNCTIONS before they happen? If certain parts are known to wear out after so much use, why not replace them at scheduled times before their probable failure? This, of course, is precisely what is done by the Air Force system of inspection and preventive maintenance.

Sometimes malfunctions occur on the end-item or component regardless of how effective an inspection program you may have. Malfunctions because of faulty workmanship during manufacture, repair, modification, or maintenance are termed quality deficiencies. These quality deficiencies should be reported in a timely manner so appropriate action is taken to ensure high standards are maintained on end-items or components. How well these systems work depends directly on how well you fulfill your duties and inspire and monitor the specialists working under your supervision.

Would you trust your mechanic to work on your car without reference materials? Would you prefer that he or she uses precise, detailed instructions to perform the work on your vehicle, or would you be ok if he or she “winged it”? The cost of aircraft and the safety of the crews make guessing on maintenance inconceivable. In today’s Air Force, all the maintenance we do, in some way, is governed by a TO publication. In this unit, we will also discuss the various types of Air Force TOs. They tell you how to do a specific task to help the Air Force accomplish its mission. We will review the Air Force TO system to learn the various types and contents of TOs, how they are numbered and how to select, use, maintain, and update TOs. Additionally, we will discuss ways to improve TOs.

4–1. Maintenance and Inspection Systems

To become familiar with the aircraft inspection methods and materiel deficiency reporting procedures, you need to understand the objectives and breakdown of the maintenance and inspection system.

027. Inspection concepts and basic scheduled inspections

The inspection methods and concepts have different names and functions, but they all serve the same goal: to prevent small problems from becoming big problems. The Air Force uses four basic inspection concepts: periodic (PE), phased (PH), isochronal (ISO), and programmed depot maintenance (PDM). The ISO concept is used to better accommodate aircraft scheduling. The PH concept keeps the aircraft out of commission for the shortest period of time. Most of the older aircraft still used by the Air Force are on the PE concept. PE, PH, and ISO inspections fall under the PDM concept.

Inspection concepts

As mentioned above, four authorized inspection concepts are used by the Air Force: PE, PH, ISO, and PDM. All of these inspections are listed in TO 00–20–1, *Aerospace Equipment Maintenance Inspection, Documentation, Policies, and Procedures*, in great detail. The –6 TO or –6 TO work cards authorize use of each concept. The scheduled inspections under each concept are listed in the following table:

Concept	Inspections
Periodic	Preflight (PR) End of runway (EOR) Thruflight (TH) Basic post operation/flight (BPO) Hourly post operation/flight (HPO) PE
Phased	PR EOR TH BPO PH
Isochronal	PR EOR TH BPO (optional) Home station check (HSC) Minor (MIN) Major (MAJ)
Programmed depot maintenance	PR EOR TH BPO HPO PE PH HSC MIN MAJ

Programmed depot maintenance

The PDM is an inspection requiring skills, equipment, and facilities beyond a normal operating unit. It applies to all units regardless of whether they are under the PE, PH, or ISO concepts.

Basic scheduled inspections

The inspections you will more than likely become involved with are the PR, EOR, TH, and BPO inspections. The basic purposes of all four of these inspections are flight stability, suitability, and preparedness. Each inspection requires you to examine the weapons system or components being used during a particular mission. This process ensures defects or hazards do not exist and will not interfere with further use of the weapons system or its components.

Under the ISO concept, the BPO is optional and the TH has the same scope as the BPO. If used this way, the TH is accomplished both between flights and after each flying period or mission. However, the system manager (for each type of equipment using the ISO concept) in conjunction with the MAJCOM may establish, as an option, separate TH and BPO inspections. If this option is used under the ISO concept, the TH is only accomplished between each flight, and the BPO is accomplished at the end of each flying period or mission.

Preflight inspection (all concepts)

The PR inspection, as the name implies, is basically a flight preparedness check. This inspection is performed before resuming flying activity after the aircraft has been inactive for a specified period of time. The PR inspection is required before the first flight of the day. The inspection is a thorough visual inspection and an operational check of certain systems and components to ensure no defects exist.

The weapons system is normally checked for safety and security if it's loaded. For example, if a gun system is loaded, it is checked to ensure it is safe, the proper type of ammunition is installed, all applicable electrical connectors are installed properly, and all panels are secure.

End-of-runway inspection (all concepts)

The EOR inspection is a final visual inspection and can include operational checks on some aircraft systems. It is completed just before aircraft takeoff. The purpose of the inspection is to detect any defects caused by or developed during ground operation of the aircraft. This operation of the aircraft normally includes engine run-up and taxiing of the aircraft to the EOR area. The inspection includes such items as the following: tires for cuts; fluid system for leakage; safety clips, covers, and pins removed; panels and doors closed and fastened. As 2W1s, this is the last chance we have to ensure the installed munitions are secured, ground safety pins are removed, and impulse cartridges are installed in all applicable stations. If we do not do our job at this point, the effects can be detrimental during a wartime situation.

Thruflight inspection (all concepts)

The TH inspection is a between-flight inspection of aircraft or weapons system components when an immediate turnaround or a continuation flight is scheduled. The aircraft and weapons system components being used are visually checked to see if any defects are present and if suitable for another mission.

Basic postflight inspection (all concepts)

The BPO inspection is performed after the last flight of the day or flying period. This inspection consists of checking the aircraft to determine whether it is suitable for another flight. Some systems or components on the aircraft only require a visual examination to ensure no defects exist. These defects could be detrimental to further flight. The inspection for weapons components consists of cleaning, lubricating, and sometimes disassembly and assembly to ensure the serviceability of the components. The BPO inspection is a more thorough check than the PR or TH inspections.

028. Characteristics of scheduled inspections and additional inspections

The Air Force uses three scheduled inspections: PE, PH, and ISO. Since you will be involved in parts of all three, you will benefit from knowing the basics about each.

Periodic inspection

The PE inspection is a more extensive inspection than the HPO and BPO inspection. In addition to the recurring inspection items, the PE inspection includes certain parts and areas of the aircraft weapons system requiring less frequent inspection (because of their function) than the BPO. The PE inspection is due when the required number of flying hours, rounds fired by a gun system, or calendar time has expired. The aircraft should not be scheduled for flight, using the portion of the weapons system, if the mission will overextend the inspection by too great a margin.

Phase inspection

The PH inspection is a combination of parts of the BPO and/or HPO and PE inspection requirements. These packages have approximately the same work content and clock hours. Combining these inspections would require an extremely long time to complete an inspection. Therefore, this inspection is broken into parts or phases. The main objective of PH inspections is to reduce the

amount of time an aircraft is out of commission for any given inspection. The amount of flying time accrued between phases depends on the aircraft or weapons system and its use.

Isochronal inspection

The PH and PE inspection concepts use flying time as the basis for scheduling. The ISO system uses specified calendar intervals to build a schedule. The three inspections peculiar to the ISO inspection system are the MAJ inspection, MIN inspection, and HSC.

Additional inspections concepts

Not all inspections are solely preventative measures; some are driven by one-time occurrences or due to special situations. These are referred to as supplemental inspections. The supplemental inspections include acceptance, special, and time-replacement item inspections.

Acceptance inspection

Maintenance personnel perform this inspection on all newly assigned aircraft and equipment. During the inspection, they examine the aircraft and weapons system with sufficient thoroughness to determine mechanical and electrical fitness and the completeness of its equipment and supporting documents.

Special inspections

Specifically the –6 TO contains a section concerned with special inspections. Maintenance personnel perform special inspections on the following occasions:

1. On the accrual of a specific number of flying hours of operation.
2. Following the lapse of a specific calendar time.
3. After the occurrence of a specific or unusual condition.

Normally maintenance personnel perform hourly or calendar requirements of the special inspections along with the next BPO or PH inspection as appropriate.

Time-replacement item inspection

The –6 TO also contains a section entitled “replacement schedule.” This section lists items of equipment replaced at the accrual of a specific interval of time (flying hours, equipment operating time, or calendar time) and following the occurrence of a specific condition. The hourly and calendar requirements, when due, are added to the nearest PH inspection (HPO or PE if performed under the PE concept).

029. Deficiency reporting and investigation system

The MDC system is the primary source of data collection and, therefore, is the principal source of materiel deficiency information. However, this system does not cover all reportable deficiencies. The USAF Deficiency Reporting (DR) and Investigating System feeds deficiency data back to those activities responsible for developing and procuring materiel for the Air Force and to other logistic management functions so they can act to correct and prevent material design and quality deficiencies.

Purpose

The purpose of the DR program is to ensure the Air Force has a system to feedback deficiency data on hardware, mission-critical computer systems, and any other government acquired equipment. The system ensures this deficiency information is routed to the activities responsible for development, procurement, and other logistic management functions so action can be taken to correct and prevent maintenance, materiel, design, and quality deficiencies. The DR system starts with you. TO 00–35D–54, *USAF Deficiency Reporting and Investigating System*, covers MDR.

Deficiency types

Air Force personnel must be concerned with five different discrepancy types. The discrepancies and their definitions are described in the following paragraphs.

Design deficiency

A design deficiency limits or prevents a materiel from being used for its intended purpose. These types of deficiencies can only be corrected through a design change.

Maintenance deficiency

The maintenance deficiency, as it sounds, normally results in an excessive consumption of maintenance man-hours.

Factors you must consider when dealing with maintenance deficiencies are as follows:

- Simplicity.
- Accessibility.
- Supportability.
- Standardization.
- Interchangeability.

Examples of these factors might include the unsatisfactory accessibility to areas requiring inspection, servicing, replacement, and repair; inadequate interchangeability of parts; or high rate of nonavailability of special tools, test equipment, and facilities to accomplish scheduled and unscheduled maintenance. All of these factors must be considered, because they can have a grave impact on the AF mission.

Materiel deficiency

The materiel deficiency is considered to be due to a failure of some internal component or subassembly of a piece of equipment. This can be materiel stress due to pressure or vibration. It also can be a deficiency due to excessive materiel wear. This type of deficiency is not attributable to the repair or manufacturing process. A good example of this type of deficiency is a problem found in the housing assemblies of the M–39 gun. The stress being placed on the gun housing during firing was causing cracks to develop in the corners of the housing assemblies. The maintenance being performed on the housing and design were fine; the problem was actual metal fatigue.

Quality deficiency

A quality deficiency is normally a deficiency caused by errors in workmanship. These errors can range from the manufacturer to you not complying with TO requirements. The failure or malfunctions of any component *not* attributed to workmanship or nonconformance to technical requirements are not reported as quality defects under the DR system.

Software deficiency

As computers are used more and more throughout the maintenance areas of the Air Force, you may have to become involved with the reporting of software defects. A software defect is generally considered as an error in the statements or instructions of a computer program.

Defect types

The different types of deficiencies are, of course, caused by defects. These defects are broken down into three types (minor, major, and critical) to help further classify the deficiencies. Their descriptions are as follows:

Defect Types	Descriptions
Minor	A defect not likely to reduce usability of the unit or product for the intended purpose or is a departure from established standards having little bearing on the effective operation of the unit.
Major	A defect, other than critical, likely to result in failure or reduce usability of the product for its intended purpose.

Defect Types	Descriptions
Critical	A defect where judgment and experience indicate the defect is likely to result in hazardous or unsafe conditions for individuals using, maintaining, operating, or depending upon the product; or a defect where judgment and experience indicate the defect is likely to prevent performance of the tactical or strategic function of a major end-item, such as an aircraft or major part thereof.

Several areas of concern must be given to ensure the DR system works as designed. They are timeliness, exhibit status, and deficiency tracking.

Timeliness

The time suspense must be met to ensure deficiencies, especially DRs, are reported, investigated, and corrected as soon as possible. Remember, the starting point for any DR is you.

Exhibit status

Even though this area is not your primary responsibility, you should know DR exhibits must constantly be tracked and controlled throughout the AF supply system. We want to ensure they are not lost and keep them from becoming needlessly tied up or bottlenecked someplace because it will delay their processing. Remember, once investigations of DRs are completed, the equipment must be returned to you. The equipment is still AF property, and you are still held responsible for it as long as it is part of your CA/CRL or SPRAM account.

Deficiency tracking

Reported deficiencies of all types must be recorded and tracked through the DR process. We must ensure similar deficiencies are correlated and trends are recognized through this program.

This summary of the DR process is very “general” in nature and does not cover all possible circumstances and conditions. For specific details and circumstances, you will need to consult TO 00–35D–54.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

027. Inspection concepts and basic scheduled inspections

1. Under what four inspection concepts are AF aircraft and weapons systems inspected?

2. Match the concepts in column B with the scheduled inspections in column A. Column B items may be used more than once.

Column A	*Column B*
____ (1) Preflight.	a. Phased.
____ (2) Periodic.	b. Periodic.
____ (3) Home station check.	c. Isochronal.
____ (4) End-of-runway.	
____ (5) Basic postflight.	
____ (6) Hourly postflight.	
____ (7) Thruflight.	
____ (8) Minor.	
____ (9) Phase.	

3. What basic inspection is accomplished just before flight?

4. Which type of inspection determines if the aircraft or weapons system is suitable for another mission?

028. Characteristics of scheduled inspections and additional inspections

1. What three factors affect when a PE inspection might become due?

2. What is the main objective of the PH inspection?

3. What types of inspections are included in the supplemental inspection area?

4. When is an acceptance inspection performed?

5. Give three occasions when a special inspection may be required.

029. Deficiency reporting and investigation system

1. What is the purpose of the USAF DR and Investigating System?

2. What TO covers MDR?

3. What are the five types of deficiencies?

4. What type of a deficiency is caused by errors in workmanship?

5. Where is the starting point for a DR?

4–2. Types of Technical Orders

As you already know, TOs are the source of information for the equipment on which you work. In most TOs, you'll find instructions and information pertaining to the operation, servicing, inspection, maintenance, modification, and overhaul of weapons, missiles, reentry vehicle systems, and other operational support equipment. Every time you perform a task, you must use a TO for reference. Since the TO file in your organization is such an important maintenance tool, it is imperative you understand the overall TO system. Although some of the following information may serve as a cursory review, the rest of it will introduce you to publications you have never used or may not know. In any case, TO 00–5–1, *AF Technical Order System* will give you the information you can use to understand the overall Air Force TO system.

030. Relationships of technical orders

There are several types of TOs. They are illustrated in figure 4–1 and are as follows:

1. Operations and maintenance TOs.
2. Preliminary technical orders (PTO) (see note in fig. 4–1).
3. TCTO.
4. Methods and procedures TOs.
5. Index-type TOs.
6. Abbreviated TOs.
7. Interactive Electronic Technical Manual (IETM).

Some of these types will become quite familiar to you, and some you may never see. We will start our discussion of TOs with the publications in the technical manual group.

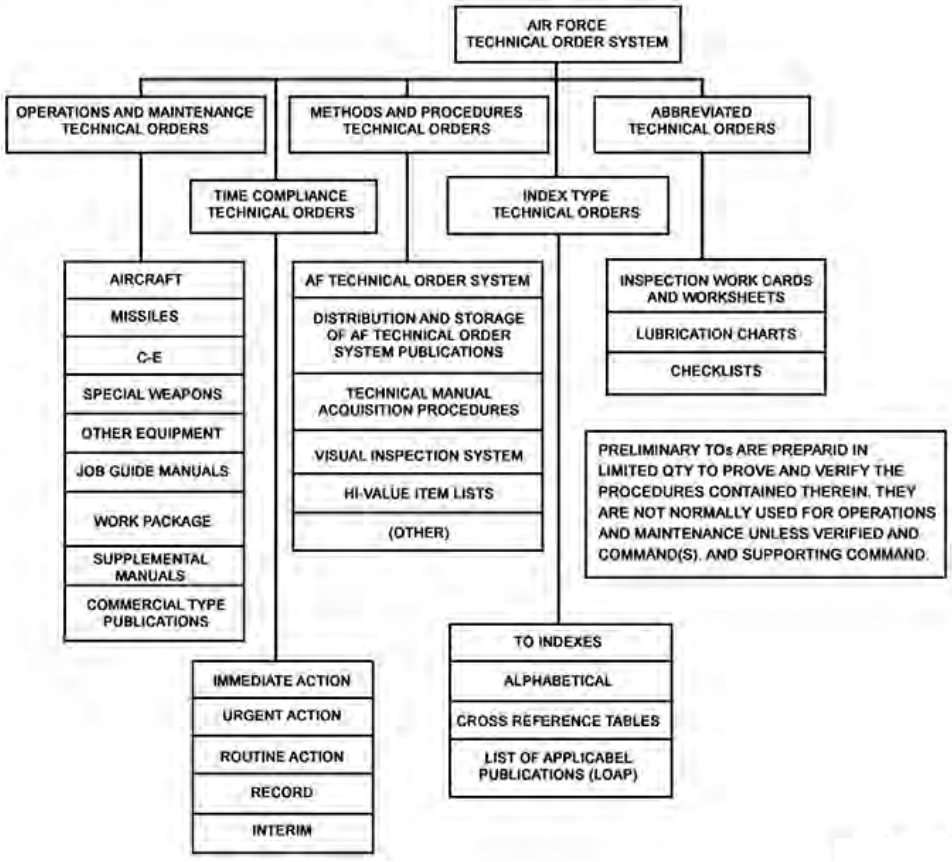


Figure 4–1. AF Technical Order System.

Technical manuals

Technical manuals contain operation, maintenance, service, overhaul, installation, and inspection instructions. They are divided into seven different types: aircraft, missiles, communications and electronics (CE) equipment, special (nuclear) weapons, other equipment, job guide manuals, work packages, supplemental manuals, and commercial-type publications. Most of the technical manuals you use are in the aircraft group (the 1A, 1F, or 1B category). The "other" group includes manuals on hand and power tools; common test equipment, such as a fluke meter; and handling equipment, such as air compressors, tugs, forklifts, and hoists.

Preliminary technical orders

PTOs are prepared in limited quantities to test and verify certain procedures for use with the first test or early production models of some missiles, aircraft, or ground support equipment.

Time compliance technical orders

It is virtually impossible to design and develop a piece of equipment without a single feature or design deficiency. So it is with AF equipment. TCTOs are the means used to carry out modifications and modernization programs. The TCTOs you will use are the immediate action, urgent action, routine action, record, and interim TCTOs. Refer to figures 4–2 and 4–3 as each is discussed.

Figure 4–2. TCTOs cover (Sample 1 of 2).

Figure 4–3. TCTO cover (Sample 2 of 2).

Immediate action time compliance technical orders

These are issued because of unsafe conditions. If the condition is left uncorrected, it could result in fatal or serious injury to personnel or extensive damage or destruction to property. These TCTOs require immediate action. The methods for correction of the condition are given in the TCTO. The words IMMEDIATE ACTION are printed in red at the top of the TCTO, and red Xs surround the first page to provide a means of distinctive identification. Commanders ensure that these TCTOs are disseminated to all affected personnel within four hours after receipt.

Urgent action time compliance technical orders

These are issued because of combat necessity or a potentially hazardous condition. These conditions could result in injury to personnel, damage to valuable property, or unacceptable reductions in combat efficiency. Such conditions compromise safety and embody calculated risks to be tolerable only within specific time limits. Thus, this TCTO establishes specific time limits for compliance with the instructions. If compliance is not achieved by the expiration of the time limits, these TCTOs direct discontinued use of the equipment. The words URGENT ACTION are printed in red across the top of the page bordered by red diagonals and circled red Xs (*not* shown in fig. 4–3). These red markings serve to identify the urgency of the TCTO.

Routine action time compliance technical orders

These are issued when equipment or procedures:

1. Constitute a hazard through prolonged usage.

2. Have a negative effect on operational efficiency.
3. Reduce tactical or support utility.
4. Reduce the operational life or general service utilization of systems or equipment.

Record time compliance technical orders

These TCTOs do not contain step-by-step instructions in the "how work is accomplished" paragraph. They tabulate the equipment affected, index necessary installation drawings and instructions, and list required parts provided by kits. Symbol entries are not required on maintenance forms for record TCTOs. Distinguishing red markings are not required for record TCTOs. All other aspects of the record TCTO contain the same information and support as other TCTOs.

Interim time compliance technical orders

These are issued when circumstances preclude the timely publication of emergency instructions in printed form. They are called "interims" or interim time compliance technical orders (ITCTO) and are normally restricted to a condition where an immediate action, urgent action, or routine action TCTO is issued. Formal TCTOs replacing ITCTOs are prepared and distributed within 40 calendar days after issuing the ITCTO. There is no fool-proof system to bring modifications to your attention. It is important you are aware of TCTOs as soon as possible, not only to update your equipment, but also to obtain modification kits and special tools before the TO is rescinded. You can learn about TCTOs by making periodic checks of the indexes, usually when you are replacing an old index with a new one (routine check), when you are posting changes to an index, or when you are making a periodic inventory (annual check). Each TCTO has a final TO number designator of –501 or higher—for example, the –523 in TO 33A1–12–2–523.

Methods and procedures technical orders

Publications of this type give supervisory and administrative personnel general information and instructions in several subject areas. They differ from technical manuals because they do not deal with specific equipment. Many of these TOs are in the 00 category and include these general publications:

1. 00–5, Air Force Technical Order System.
2. 00–20, Maintenance Management System.
3. 00–25, Miscellaneous Technical Orders.
4. 00–35, Administrative (includes unsatisfactory reports).
5. 00–100, Quality Control.

Index-type technical orders

As an armament systems specialist, you will frequently use indexes to find information or the change or revision status of a TO. Indexes are a valuable tool in narrowing down the TO you are looking for from the 90,000 TOs available. This is true in the 11N category, as well as in the system as a whole. There is an index for each category of TOs. There is also an index listing of all of these indexes. An index shows the status of TOs and gives a basis for determining initial distribution and requisition requirements and for updating TO files and records. Each index covers a TO category or a section of a category when the category is subdivided. The TO indexes are divided into two parts:

- *Part I* lists new TOs, updated, or inactivated since issue of the last index revision. It also lists new basic TOs in preparation, except TCTOs.
- *Part II* lists all active TOs, both new and prior entries. This part is used to check the status of individual TOs and to identify all TOs applicable for specific equipment.

Abbreviated technical orders

These TOs are primarily work simplification devices to aid personnel in carrying out instructions contained in other types of TOs.

Abbreviated Technical Orders	
TOs	**Description**
Inspection Work Cards	These sets of cards list inspection requirements, as given in the –6 (inspection requirements) manual in a checklist form. Since they are card size, you can take them to the job while you perform a scheduled inspection. Charts on the back of certain cards locate pictorially each work area and give the code and title of the areas referred to in each set of cards.
Checklists	Originally this type of TO was used only by aircraft crewmembers. However, many organizations, including munitions units, now use checklists. These list tasks in chronological order. The maintenance crew performs each task in the proper sequence and checks it off when it is completed. You may be required to use the checklists authorized and prepared by the headquarters of your command.

Automation technical orders

Automation TOs are in the form of tapes or cards. The tapes or cards run through a programmed test set for the purpose of automatically locating and indicating malfunctions in the system being checked. For specific weapons systems, software formerly identified in the TO system has been re-identified to the computer program identification numbering (CPIN) system. Requirements and distribution functions now in the CPIN system continue to be the responsibility of established technical order distribution offices (TODO).

Interactive electronic technical manual

During the F–22 development process, it was determined that the traditional paper TO system was something that the Air Force wanted to dispense. The replacement system is a completely electronic format called the IETM.

An IETM (*not* shown in fig. 4–1) is an electronic technical manual available through the IMIS desktop allowing the maintainer access to all technical data required to perform a necessary maintenance procedure. It replaces the traditional paper TOs and allows maintainers to navigate via links to other TOs referred to in the current procedure and parts information. IETM is stored in the IMIS operating system and downloaded to the PMA or other IMIS-enabled platform. There are four distinct types of IETM tasks: procedural, descriptive information, fault isolation, and parts information. The tasks contain maintenance and support data enabling a maintainer to troubleshoot, repair, test, service the aircraft, and acquire parts.

The most common method of technical order data (TOD) selection is by system/task menu (fig. 4–4). From the TO presentation screen, the user activates the *Access TOD* and the TOD Selection *By System* screen is displayed. Using the provided dropdown menu the maintainers chooses the system subsystem subject number (SSSN); this number is similar to the work unit code (WUC) used in legacy systems. To select the desired SSSN, place the cursor on the SSSN and click the left mouse button. The SSSN (if known) may also be entered directly in the "Selection" box. The related *Task*, *Theory*, or *Fault* is presented in the "Selection" box, depending on the filter setting. Left click on the item in the "Selection" box for technical manual data.

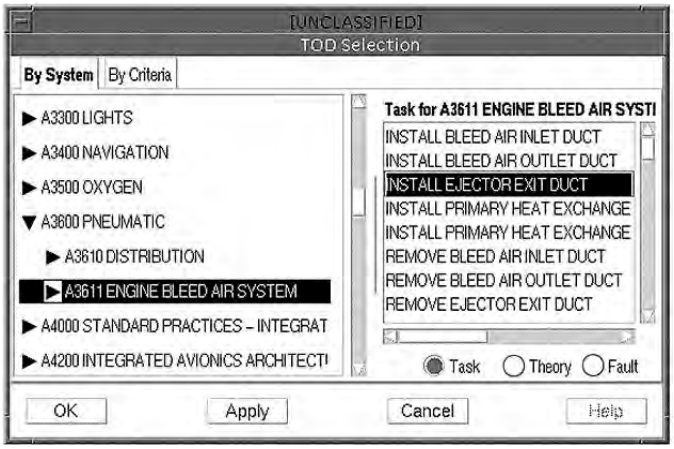


Figure 4–4. System/task menu.

Another common method of accessing the required TO information is by entering the fault reporting code (FRC) (fig. 4–5). When the aircraft encounters a system fault, an FRC is generated and reported to maintenance during debrief. This FRC identifies the given fault and related system it deals with. From the Technical Order Presentation screen, the user activates the *Access TOD* and then selects *AV Fault Session.* The system, using the FRC, identifies and presents the appropriate TO task. For a referenced task the user selects the ACCESS button and the TO becomes available to the user.

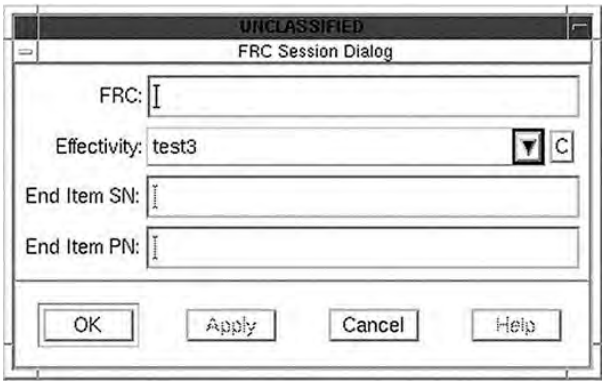


Figure 4–5. FRC session dialog.

031. Understanding technical order numbers

The basic task of TO numbering is to group similar TOD into categories, systems, equipment series, and equipment subseries by means of an identifying numeric or alphanumeric TO number.

Technical order numbering

TO numbers are composed of groups separated by dashes, and each group is further divided into parts. The maximum number of groups that can make up a TO number is seven. Maintainers, however, will rarely encounter seven TO groupings. The maximum amount of groups that you will encounter will be six, and this is what we will limit our instruction to.

For example, let's break down **TO 1F–16CG–2–94JG–30–2**. This number can be broken down into six groups separated by dashes.

The first group is called the "category"; it identifies in the broadest terms what the TO covers. In this case, the **1** identifies the fact that we are covering aircraft. The following **F** identifies the mission of the aircraft. In this case, it is identified as a fighter aircraft. Other common mission identifiers that armament technicians may encounter are **A** for attack, **B** for bomber, **H** for helicopter, or **Q** for unmanned air vehicle.

The second group contains two or three parts that incorporate the aircraft model number; the modified aircraft mission (in parentheses) if applicable, and aircraft production series if required. In our example, the second group in our TO number identifies the fact that this book contains information on the **F–16C** model aircraft in the **G** production series.

The third group primarily identifies the type of TO, instruction, or procedure. This can be accomplished by using either one or two parts. Part one consists of one or more numeric characters reserved to indicate a specific type of TO. In our example, the **–2** identifies this as a maintenance instruction.

Technical Order Numbering	
Third group	**Meaning**
–01	List of applicable publications.
–06	WUC manual.
–1	Operation and associated checklist; flight, assembly, test, and storage; operation and maintenance instructions.
–2	Organizational maintenance and associated checklists; service or maintenance; overhaul instructions.
–4	IPB.

Technical Order Numbering	
Third group	**Meaning**
–6	Inspection requirements.
–33–1	Nonnuclear Munitions Loading – Tactical Missions.
–34–1	Nonnuclear Munitions Delivery – Tactical Missions.
–501 (and higher)	TCTOs.

So with the information we have from the first three sections, we know we have a maintenance TO for the F–16 aircraft. Now we move on to group four, which consists of either one or two parts that identify a supplemental manual, identify sections of a sectionalized TO, or indicate the sequence number of specific TOD in a series of inspections, supplements, or functions. Section four of our example is made up of two parts. The first is **94**. This identifies which basic system that this manual is going to cover, in this case the armament system. The second part of our fourth group is **JG**. This refers to job guides that will give you step-by-step instructions on specific tasks or jobs. Other commonly used codes include **FI**, which is shorthand for fault isolation, **GS** that represents general system capabilities and functions, and the **WD** or wiring diagram.

The fifth group is used if TO numbers have been extended by sectionalizing or establishing supplemental numbers; the use of group five may be necessary to complete the TO number. In other words, the fifth group may be used to refine the system referred to in the fourth group into subgroups further. For our example, **30** refers to the external stores suspension equipment subsystem of the broader system that the **94** armament system refers to.

Finally, group six consists of one part made up of one or more numeric characters. Group six identifies a supplemental manual, identifies sections of a sectionalized TO; or indicates the sequence number of specific TOD in a series of inspections, supplements, or functions. In our example, **2** refers to the wing weapons pylons. There are other books in the **94JG–30** series that refer to other systems; for example, the sixth group **1** would refer to the centerline pylon.

The easiest way to think about the TO numbering system is as a process of elimination.

- **1F** eliminates anything that is not a fighter aircraft.
- **–16CG** eliminates all fighter aircraft that are not F–16 C model production series G.
- **–2** eliminates all manuals for the F–16C fighter aircraft that do not reference organizational maintenance and associated checklists, service or maintenance, or overhaul instructions.
- **–94JG** eliminates all F–16C manuals that do not cover detailed descriptions on how to perform armament systems specific tasks.
- **–30** eliminates all F–16C armament system job guides that do not cover external stores suspension equipment.
- **–2** eliminates all F–16C armament external stores suspension equipment system job guides that do not involve wing weapons pylons.

Selecting technical orders

What TO do I need to do the job? There are a couple of different ways of finding this information. The first and probably the most common way is to use a quick-reference listing. At some time in the past, someone in your shop probably sat down and devised a referenced list for all the equipment you work on and their applicable TOs. Consequently, everyone just goes to that list and looks up the information he or she needs. But, what if that quick reference list is lost? Oh, sure someone will have been around long enough and be able to give you the information you need. What happens if they go on leave, go temporary duty (TDY), or separate?

TO 0–1–01 is the *Numerical Index and Reference Table (NI&RT)*. This TO lists major indexes by category (i.e., fighter aircraft, bomber aircraft, etc.). One of the indexes will list equipment in alphabetic order and give the TO number for each. Another index will list all TOs in numerical order and give the specific equipment for each. Can you see how the index TO could be very useful?

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

030. Relationships of technical orders

1. What information do technical manuals contain?

2. When is a TO considered a PTO?

3. Which type of TO carries out modification and modernization programs?

4. List the five types of TCTOs.

5. How do methods and procedures TOs differ from technical manuals?

6. What are two functions provided by the index-type TO?

7. What is an abbreviated TO, and how is it used?

8. Which type of TO is in the form of tapes or cards?

9. How are IETMs accessed?

10. What are the four distinct types of IETM tasks?

11. What is the most common method of TOD selection?

031. Understanding technical order numbers

1. Which group identifies a supplemental manual, identifies sections of a sectionalized TO, or indicates the sequence number of specific TOD in a series of inspections, supplements, or functions?

2. What information is contained in group six?

4–3. Technical Order Updating, Maintenance, and Change Procedures

TOs must be updated to keep up with modifications to existing equipment and aircraft, when new equipment and aircraft are purchased, and when new procedures are developed. The first two lessons deal with the processes surrounding legacy TOs covering the majority of equipment. The final lesson deals with the newer TOD system which covers the F–22.

032. Characteristics of technical order updates

In this lesson, we discuss the methods the Air Force uses to keep legacy TOs current and maintain paper TO files so you can ensure you are using current TOs.

Changes

Changes are issued only when parts of the existing TO need updating or revising. The obsolete material is deleted, and the new data is incorporated. Changed pages replace the corresponding numbered pages in the existing publications. All replaced pages are removed and in compliance with TO 00–5–1, destroyed by any method to prevent the disclosure of the contents or reconstruction of the document. If change material cannot be fully included in a replacement page, additional pages are added. These additional pages bear the number of the preceding page augmented by a letter or number suffix. For example, additions to page 20 of a given publication are carried on pages 20A, 20B, and so forth, or the additional pages will be carried on 20.1, 20.2, and so forth and are filed in sequence.

Changed pages are identified by change numbers printed at the bottom in the corner beside the page number. Changes in the text are indicated by a heavy black line in the outer margin of the page, next to the changed part of the text. A new title page is issued with each change, bearing the original publication date and a changed date added. To make sure changes are not confused with new publications, CHANGE is printed across the face of the accompanying title page. A listing of the changed pages is printed on the “A” page in numerical order and their respective change dates. By reference to the “A” page, you can determine whether the publication is complete and current.

Supplements

Supplements to basic publications are issued as separate publications incorporating augmented or revised data either not adaptable to inclusion as revision pages or is more expediently, economically, or practically issued as a supplement. Normally, supplements are cumulative—that is, each succeeding supplement supersedes the preceding supplement and includes the data contained in it. Occasionally, however, it is necessary to issue noncumulative supplements; an example is an interim operational supplement.

The supplement bears the same title and numerical designators as the related basic publications, followed by a letter suffix. For example, TO 00–5–1 is supplemented by interim operational supplement TO 00–5–1A, TO 00–5–1B, TO 00–5–1C, and so forth, in order.

Appendixes

Appendixes to publications include material outside of the normal sequence outlined in the table of contents. They can be tables, charts, or supplementary information. The appendix becomes an integral part of the publication. The appendix may be issued as part of the basic publication or separately. In the latter case, the appendix is issued with a changed title page to be substituted for the existing title page of the basic publication. The changed title page bears a revised publication date and a CHANGE strip. The pages of appendixes are then included at the end of the basic publication. The inclusion of an appendix in a publication is shown on the "A" page in a manner similar to that used for change pages.

Revisions

Revisions are complete new editions of a publication and bear a new publication date. They replace the original publication, including any changes, appendixes, and, in most cases, all existing supplements. When the changes affect more than 80 percent of the text, a revision is issued.

Automated Technical Order Management System

The Automated Technical Order Management System (ATOMS) concept is based on the Air Force requirement to maintain records on TOs. The ATOMS is a computer program designed to accomplish TO files maintenance. This system eliminates the need to maintain a manual system.

033. Legacy technical order improvement reports and when to submit them

You may have trouble in deciding whether or not a TO deficiency is of a type you should report. TO 00–5–1 says, "TO improvement reports are a recommended correction of an error or omission of a technical nature preventing adequate performance of functions for mission accomplishment."

Technical order improvement reports

If you are contemplating submitting a legacy TO improvement report, remember that minor, nontechnical inaccuracies should not be reported unless they change the meaning of instructive information and/or procedures. Also consider the effect the suspected deficiency will have on your mission, safety, costs involved in changing the TO, possible damage to equipment, work simplification, manpower savings, and urgency of the change.

There are three types of legacy TO improvement reports: emergency, urgent, and routine. The title of each report indicates the seriousness of the needed improvement. You handle each report in a similar manner, giving priority to more important reports. Initiate and submit emergency reports immediately after discovering the condition. Expedite urgent reports, and initiate and submit routine reports as soon as possible.

Emergency reports

These reports describe TO deficiencies affecting safety and the unit mission. If not corrected, the deficiency will surely result in fatal or serious injury to personnel, extensive damage to or destruction of equipment or property, or the inability to achieve or maintain operational readiness. The activity must act within 48 hours after it receives one of these reports to correct the deficiency. It must issue an ITCTO, an interim safety supplement, or an interim operational safety supplement. It can also disapprove or downgrade the report to a lower priority.

You should prepare emergency reports in electrical message form and assign a precedence of IMMEDIATE. Transmit the action copy to the Air Force Logistics Command (AFLC) activity shown in the Storage and Issue column of the index or the activity designated in TO 00–5–1. Electrically transmit an information copy (same procedure) to your MAJCOM or to an address specified by your MAJCOM. You may have to transmit other information copies. The subject of the message should read "Emergency AFTO Form 22." Refer to TO 00–5–1 for instructions on how to make entries on AFTO Form 22, Technical Manual (TM) Change Recommendation and Reply.

Urgent reports

Urgent reports recommend the nonemergency correction of a TO deficiency involving a hazardous condition. If not corrected, the deficiency *can* result in injury to people, damage to equipment or property, or reduced operating efficiency. The category includes deficiencies risking the safety or success of your mission. The corrective activity issues a corrective TO change, revision, or supplement within 40 calendar days after receiving an urgent report. No reply is made to the report unless it is disapproved or downgraded or the corrective action cannot be completed within 40 calendar days.

Routine reports

Routine reports recommend TO improvements that, if not made, may produce a hazardous condition through continued use and may have a negative effect on operation or maintenance efficiency or on the operating life or general service use of the equipment. They also describe TO improvements for simplifying work, saving manpower and man-hours, clarifying procedures, and correcting editorial errors.

In specific cases, routine reports are answered or disapproved. A report dealing with nuclear weapons is usually answered. If answered, the activity correcting a deficiency replies to routine reports within 45 days stating the action taken or the reason for disapproval. Except as stated in TO 00–5–1, changes, revisions, or supplements resulting from approved reports are published at the earliest practical date, not to exceed 210 days after the receipt of the report.

Preparation and submission of AFTO Form 22

A specialist of any grade or rank can submit an improvement report. The AFTO Form 22 report comes close to being a personal report from the worker to someone who can correct the deficiency. Block 8 is a record of the person who knows the problem; take care to ensure this block does not contain the name of his or her supervisor or crew chief.

In TO 00–5–1, you can find detailed instructions for preparing and submitting an AFTO Form 22. Read the entire section and follow the instructions step-by-step when you prepare a report, particularly your first one. Because you may be stationed in a variety of geographical locations, also follow the additional local ground rules for preparing and submitting this form.

If you complete an AFTO Form 22 containing classified data, mark it with the proper classification and the appropriate downgrading and declassification instructions prescribed in Department of Defense (DOD) 5200.1–R, *DOD Information Security Program*, and ~~AFI 31–401, *Information Security Program Management.*~~ If you make an unclassified report on a classified manual, identify it as unclassified on all the AFTO Forms 22 with a simple statement, such as “This is an unclassified Form 22 on a classified manual.” If you find a security violation involving a TO, report it according to ~~AFI 31–401~~ and do not use an AFTO Form 22.

Make good use of the AFTO Form 22 because it is a simple means of correcting incorrect weapons inspection and maintenance procedures.

034. Interactive electronic technical manual changes

Changes to IETM-based TOD are handled differently than with legacy paper systems. They take the form of technical order data change request (TODCR) and action requests.

Technical order data change requests

The TODCR is a change to technical data generated by the customer. A database provides the status of each change request through all process phases and the capability to generate status reports. TOD changes may be initiated through the IMIS desktop (fig. 4–6). The *Access TOD Change Request* menu option auto-fills the publication information, such as publication number, function number, publication title, item, step, page, and so forth.

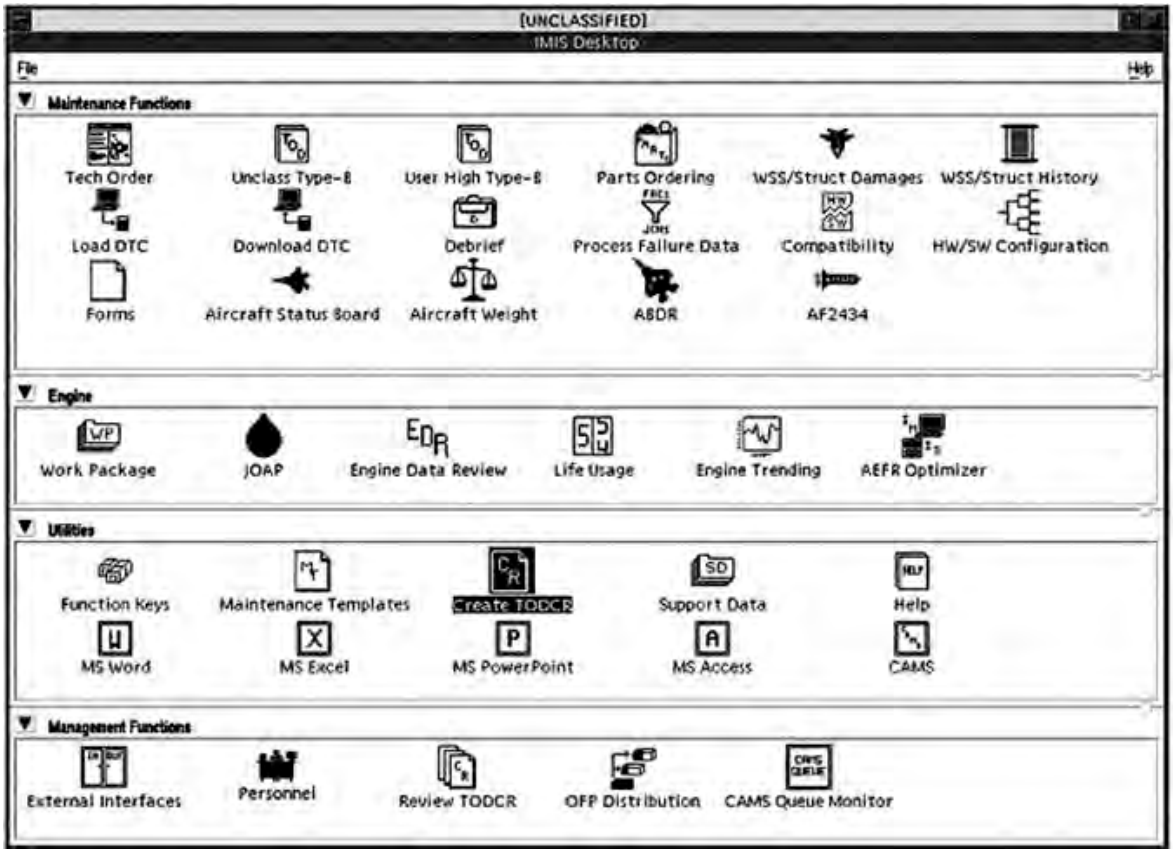


Figure 4–6. IMIS desktop.

The *Create TOD Change Request* menu option requires the manual entry of publication information. This method is useful for noninteractive electronic manuals. The change request status may be accessed through Review TODCR icon on the IMIS desktop.

The user generally initiates the TODCR through the IMIS desktop. The originator is primarily responsible for the following:

- Initial security rating of the TODCR according to the TOD that the change is referring.
- Assigning a priority and work center code (WCC) (similar to WUC) using pull-down menus on the *TODCR* screen.
- Assigning a title to the TODCR (50-character maximum).
- Completing the actual changes to the text that the initiator is recommending in the “TM Recommended Change” window.

The TODCR is then directed to the originator’s supervisor for review. If the TODCR is approved by the supervisor, it is forwarded to QA for maintenance-related topics or weapons standardization for munitions loading topics where TODCR is subjected to an approval process that determines the TODCR’s technical validity. If approved, it is transmitted to the technical order distribution assistance (TODA)/TODO for approval and editing. Finally, it is sent to Joint Computer-aided Acquisition and Logistics Support (JCALS) for final approval and distribution.

Action requests (AR) are changes generated by either the customer or F–22A field service representatives in response to product support issues involving the aircraft, support equipment, or technical data. ARs for TOD are forwarded to the Raptor Support Center and are either resolved by the field service representatives or forwarded to the appropriate contractor integrated product team for resolution. The resolution drives changes to the aircraft, support equipment, or the technical data.

ARs may be a catalyst for a TODCR, but they are not a substitute for a TODCR as they are more limited in scope.

Once changes or ARs are processed by the approval or resolving process they need to be distributed to the field for use. Changes to TOD are handled by JCALS. After final approval, JCALS sends the revised data to all units operating the affected IETM. The change is downloaded by the MSUs of all affected units. The unit MSU automatically downloads the information to the IMIS workstations or the PMA when they are docked to the system. Maintainers are, in effect, checking for new updates to all their TOD every time they dock their PMA.

Self-Test Questions

After you complete these questions, you may check your answers at the end of the unit.

032. Characteristics of technical order updates

1. When are changes issued?

2. How are changes identified?

3. Why are supplements to basic publications issued?

4. What is an appendix?

5. Describe a revision.

033. Legacy technical order improvement reports and when to submit them

1. What are some things to consider when you are contemplating submitting a legacy TO improvement report?

2. Briefly describe the three types of legacy TO improvement reports.

034. Interactive electronic technical manual changes

1. Who generates a TODCR?

2. Who is responsible for assigning an initial security rating of the TODCR?

3. Who is responsible for reviewing a TODCR for technical validity if it involves munitions loading?

4. What organization is responsible for distribution of a TODCR?

5. Why is an AR not considered a replacement for a TODCR?

6. When is a TODCR downloaded to a PMA?

Answers to Self-Test Questions

027

1. (1) PE.
   (2) PH.
   (3) ISO.
   (4) PDM inspection concepts.
2. (1) a, b, c.
   (2) b.
   (3) c.
   (4) a, b, c.
   (5) a, b, c.
   (6) b.
   (7) a, b, c.
   (8) c.
   (9) a.
3. EOR inspection.
4. TH inspection.

028

1. (1) Number of flying hours; (2) rounds fired by a gun system; and (3) expired calendar days.
2. To reduce the time the aircraft is out of commission for any given inspection.
3. Special, acceptance, and time-replacement item inspections.
4. It is performed on all newly assigned aircraft or equipment.
5. (1) On the accrual of a specific number of flying hours of operation.
   (2) Following the lapse of a specific calendar time.
   (3) After the occurrence of a specific or unusual condition.

029

1. The system feeds deficiency data back to those activities responsible for developing and procuring materiel for the Air Force and to other logistic management functions so they can initiate action to correct and prevent future deficiencies.
2. TO 00–35D–54.

3. (1) Design.
   (2) Maintenance.
   (3) Materiel.
   (4) Quality.
   (5) Software.
4. Quality deficiency.
5. The starting point for any DR is you.

030

1. Operation, maintenance, service, overhaul, installation, and inspection instructions.
2. When it is prepared in limited quantities to test and verify certain procedures developed for use with the first test or early production models of some equipment.
3. TCTOs.
4. (1) Immediate action.
   (2) Urgent action.
   (3) Routine action.
   (4) Record.
   (5) Interim.
5. They do not deal with specific items of equipment.
6. (1) Shows the change or revision status of TOs; and (2) gives a basis for determining initial distribution and requisition requirements and for updating TO files and records.
7. These TOs are primarily work simplification devices to aid personnel in carrying out instructions contained in other types of TOs.
8. Automation.
9. Through the IMIS desktop.
10. (1) Procedural; (2) Descriptive information; (3) Fault isolation; and (4) Parts information.
11. By system/task.

031

1. The fourth group.
2. Group six identifies a supplemental manual; identifies sections of a sectionalized TO; or indicates the sequence number of specific TOD in a series of inspections, supplements, or functions.

032

1. When parts of a TO need updating or revising.
2. By the change numbers printed on the bottom of each page in the corner beside the page number.
3. The augmented or revised data either is not adaptable for inclusion as revision pages or it is more expediently, economically, or practically issued as a supplement.
4. It adds material that is not a part of the normal sequence outlined in the table of contents. It can be in the form of tables, charts, or supplementary material.
5. It is a complete new edition of a publication and bears a new publication date. Revisions are issued when more than 80 percent of the text needs changing.

033

1. Determine whether the deficiency prevents you from performing adequate maintenance or is simply a minor nontechnical inaccuracy. Consider the effect the deficiency has on your mission, safety, costs to correct the problem, possible damage to equipment, work simplification, manpower savings, and urgency of the change.
2. (1) Emergency reports describe deficiencies that affect safety and unit mission, and if not corrected, will surely result in fatal or serious injury to people, property, or affect your operational readiness.

(2) Urgent reports recommend the nonemergency correction of a deficiency involving a hazardous condition. If left uncorrected, the deficiency *can* result in injury, damage, or reduced operating efficiency.

(3) Routine reports recommend improvements that, if not made, may produce a hazardous condition through extended use. They can also simplify work, suggest savings, clarify procedures, and correct editorial errors.

034

1. The customer.
2. The originator/user.
3. WS.
4. JCALS.
5. Because they are more limited in scope.
6. When it is docked to the system.

Complete the unit review exercises before going to the next unit.

Unit Review Exercises

Note to Student: Consider all choices carefully, select the *best* answer to each question, and *circle* the corresponding letter. When you have completed all unit review exercises, transfer your answers to the Field-Scoring Answer Sheet.

Do not return your answer sheet to the Air Force Career Development Academy (AFCDA).

80. (027) Which inspection is performed before resuming flying activity after the aircraft has been inactive for a specified period?
    a. Postload.
    b. Preflight.
    c. Postflight.
    d. Basic post operation.

81. (027) Which inspection is a between-flight inspection of aircraft or weapons system components when an immediate turnaround or a continuation flight is scheduled?
    a. Postload.
    b. Preflight.
    c. Postflight.
    d. Thruflight.

82. (027) Which inspection is performed after the last flight of the day or flying period?
    a. Postload.
    b. Preflight.
    c. Thruflight.
    d. Basic post operation.

83. (028) Which scheduled inspection is due when the required number of flying hours, rounds fired by a gun system, or calendar time has expired?
    a. Phase inspection.
    b. Periodic inspection.
    c. Isochronal inspection.
    d. Numerical inspection.

84. (028) Which inspection is a combination of parts of the basic post operation (BPO) and/or hourly postflight (HPO) and periodic inspection requirements?
    a. Isochronal inspection.
    b. Numerical inspection.
    c. Periodic inspection.
    d. Phase inspection.

85. (028) What kind of inspection must maintenance personnel perform on all newly assigned aircraft and equipment?
    a. Isochronal inspection.
    b. Acceptance inspection.
    c. Basic scheduled inspection.
    d. Programmed depot maintenance.

86. (028) What section of the –6 technical order (TO) lists items of equipment replaced at the accrual of a specific interval of time (flying hours, equipment operating time, or calendar time) and following the occurrence of a specific condition?
    a. Deterioration table.
    b. Inspection schedule.
    c. Replacement schedule.
    d. Wear sensitive parts listing.

87. (029) The purpose of the deficiency reporting (DR) system is to
    a. prevent unnecessary maintenance.
    b. assure acquisition of repaired equipment is accomplished.
    c. ensure that the Air Force has a system to feedback deficiency data.
    d. align spare parts with Air Force needs for aircraft and equipment refurbishment.

88. (029) Which type of deficiency limits or prevents a materiel from being used for its intended purpose?
    a. Design deficiency.
    b. Quality deficiency.
    c. Material deficiency.
    d. Maintenance deficiency.

89. (029) Which type of deficiency normally results in an excessive consumption of maintenance man-hours?
    a. Design deficiency.
    b. Quality deficiency.
    c. Material deficiency.
    d. Maintenance deficiency.

90. (029) Which deficiency is a failure of some internal component or subassembly of a piece of equipment because of materiel stress due to pressure and/or vibration or to excessive materiel wear?
    a. Design deficiency.
    b. Quality deficiency.
    c. Material deficiency.
    d. Maintenance deficiency.

91. (030) In which publication will you find information or the change or revision status of a technical order (TO)?
    a. Index technical order.
    b. Technical order card catalog.
    c. Technical order update listing register.
    d. Records time compliance technical order.

92. (030) Which electronic technical manual is available through the Integrated Maintenance Information System (IMIS) desktop and allows the maintainer access to all technical data required to perform a necessary maintenance procedure?
    a. Automated technical order.
    b. Electronic technical manual.
    c. Interactive technical manual.
    d. Interactive electronic technical manual.

93. (031) In technical order (TO) 1F–16C–33–1–2, the designator "1F" identifies the
    a. category.
    b. major equipment group.
    c. general series of equipment.
    d. specific item or equipment type.

94. (031) Which publication lists major technical order (TO) indexes by category?
    a. Index technical order.
    b. Technical order card catalog.
    c. Technical order index listing register.
    d. TO 0–1–01, *Numerical Index and Reference Table.*

95. (032) How are changed pages in printed technical orders (TO) identified?
    a. By change numbers printed at the top of each page.
    b. In the index only, they are not individually identified.
    c. By black borders around the outside of the changed page.
    d. By change numbers printed at the bottom of the page in the corner beside the page number.

96. (032) What publication is issued for a technical order (TO) that contains material that is *not* part of the normal sequence outlined in the table of contents?
    a. Change.
    b. Appendix.
    c. Revision.
    d. Supplement.

97. (033) Which technical order (TO) deficiency report identifies a deficiency that affects safety and the unit mission?
    a. Emergency.
    b. Immediate.
    c. Routine.
    d. Urgent.

98. (033) Which technical order (TO) deficiency report identifies recommended TO improvements, which *if not made*, will create potentially hazardous conditions through continued use and have a negative effect on operation, maintenance efficiency, or on the operating life or general service use of the equipment?
    a. Emergency.
    b. Immediate.
    c. Routine.
    d. Urgent.

99. (033) What is the *minimum* required rank to submit a technical order (TO) improvement report?
    a. SRA.
    b. SSgt.
    c. TSgt.
    d. Specialist of any grade or rank.

100. (034) How does the user typically generate a technical order (TO) change request to change an integrated electronic technical manual?
    a. By initiating and AFTO Form 22.
    b. Through the Integrated Maintenance Data System (IMDS) desktop.
    c. Through the Integrated Maintenance Information System (IMIS) desktop.
    d. Through the technical order data change request (TODCR) application located in the Joint Computer-aided Acquisition and Logistics Support (JCALS) system.

Student Notes

Glossary

Terms

Legacy—This term refers to all aircraft and the systems that support them *exclusively* and entered into service prior to the introduction of the F–22. Legacy systems are, and continue to be an integral part of the Air Force for the foreseeable future, but the systems that uniquely support them need to be seen as the “old” way of doing business that will be discontinued when the systems that they support leave service.

Abbreviations and Acronyms

ACC	Air Combat Command
AETC	Air Education and Training Command
AFECD	Air Force Enlisted Classification Directory
AFI	Air Force instruction
AFK	munitions accounts element
AFLC	Air Force Logistics Command
AFMC	Air Force Material Command
AFPD	Air Force policy directive
AFRES	Air Force Reserve
AFS	Air Force specialty
AFSC	Air Force specialty code
AGE	aerospace ground equipment
ALC	Air Logistics Center
AME	alternate mission equipment
AMU	aircraft maintenance unit
AMXS	Aircraft Maintenance squadron
ANG	Air National Guard
APU	auxiliary power unit
AR	action request
AS	allowance standard
ATOMS	Automated Technical Order Management System
BDU	bomb dummy unit
BIT	built-in test
BPO	basic post operation
CA/CRL	custodian authorization/custody receipt listing
CAS	Combat Ammunition System

CAST	combat armament support team
CDC	career development course
CDE	common desktop environment
CE	communications and electronics
CFETP	career field education and training plan
CFM	career field manager
CPIN	computer program identification numbering
CTK	composite tool kit
DBM	data base management
DHM	diagnostic and health management
DIFM	due in for maintenance
DLA	Defense Logistics Agency
DR	deficiency report
DTC	data transfer cartridge
EAID	equipment authorized inventory data
EMS	equipment management section
EOR	end of runway
ERRC	expendability, reparability, and recovery code
FOM	facilitate other maintenance
FRC	fault reporting code
FSC	federal supply classification
GSA	General Services Administration
GUI	graphic user interface
HPO	hourly post flight
HSC	home station check
ID	identification
IDARS	Integrity Data Analysis Reporting System
IETM	interactive electronic technical manual
IMDS	Integrated Maintenance Data System
IMIS	Integrated Maintenance Information System
IPB	illustrated parts breakdown
ITCTO	interim time compliance technical order
JCALS	Joint Computer-aided Acquisition and Logistics Support
LC	lead crews
LRU	line replaceable unit
LSC	loading standardization crew

MAJ	major
MAJCOM	major command
MCL	master configuration list
MDC	maintenance data collection
MDD	maintenance data documentation
MDR	material deficiency reporting
MGN	mission generation network
MIN	minor
MK	supply code K (munitions) (pronounced Mark)
MNCL	Master Nuclear Certification Listing
MOC	maintenance operations center
MPRL	monthly proficiency required load
MSA	munitions storage area
MSL	maintenance supply liaison
MSU	maintenance server unit
MX/CC	maintenance group commander
MXS	Maintenance squadron
NATO	North Atlantic Treaty Organization
NCB	National Codification Bureau
NCE	nuclear-certified equipment
NCI	nuclear-certified item
NCO	noncommissioned officer
NI&RT	Numerical Index and Reference Table
NIE	normally installed equipment
NIIN	national item identification number
NRTS	not reparable this station
NSN	national stock number
OFP	operational flight program
OJT	on-the-job training
OPLAN	operation plan
OT&E	operational test and evaluation
OSS	Operations Support squadron
PACAF	Pacific Air Force
PDM	programmed depot maintenance
PE	personnel evaluation or periodic (inspection)
PGM	precision-guided munition

PH	phase
PMA	portable maintenance aid
PMEL	precision measurement equipment laboratory
PR	preflight
PRP	personnel reliability program
PS&D	plans scheduling and documentation
PTO	preliminary technical orders
QA	quality assurance
QAP	quality assurance program
RACC	reparable asset control center
RF	radio frequency
RN	repair network
RPC	reparable processing center
RS	recommended standard
RTS	repairable this station
SEI	special experience identifier
SPRAM	special purpose recoverable authorized maintenance
SSSN	system subsystem subject number
STS	specialty training standard
T&H	test and handling
TBA	training business area
TCTO	time compliance technical order
TH	thruflight
TI	technical inspection
TMDE	test measurement and diagnostic equipment
TO	technical order
TOD	technical order data
TODA	technical order distribution assistance
TODCR	technical order data change request
TODO	technical order distribution office
TTML	test/training munitions list
UCML	unit committed munitions list
UI	unit of issue
U&TW	utilization and training workshop
WCC	work center code
WRM	war reserve material

WS	weapons standardization
WUC	work unit code
WWM	wing weapons manager

Student Notes

Student Notes

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