DEPARTMENT OF THE AIR FORCE
Headquarters Military Airlift Command
Scott Air Force Base, Illinois 62225

MAC REGULATION 51-141

4 April 1973

Flying Training

C-141 AIRCREW TRAINING

This regulation, in conjunction with AFM 60-1 and MACR 51-1, establishes MAC standards of transition, qualification, continuation training, and operational procedures to be used by all aircrew members operating MAC C-141 aircraft.

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Chapter 1

POLICY

1-1. Purpose:

a. To identify sources and employment of formal training for C-141 aircrew personnel. Formal training will be listed in AFM 50-5, *USAF Formal Schools Catalog.*

b. To establish aircrew requirements for initial checkout/transition training, mission qualification, upgrade and continuation training for aircrew members when formal training (AFM 50-5) is not available or utilized.

c. To initially train and upgrade aircrew members to a state of proficiency, standardization, and qualification that they may be designated operationally ready to conduct or participate in global airlift or combat airlift missions on a continuing basis.

1-2. Prerequisites:

a. Before entering training, each aircrew member will meet and comply with the appropriate C-141 formal course training prerequisites as prescribed in AFM 50-5.

b. Before being designated as a crew member on MAC aircraft employed in global or combat airlift missions, candidates must have the basic qualifications prescribed in MACR 51-1.

1-3. Training Requirements:

a. The training program will be administered in the following sequence:

Phase I — Initial Checkout/Transition Training
Phase II — Mission Qualification and Upgrade Training
Phase III — Continuation Training

b. Aircrew members will complete Phase I and applicable Phase II requirements of this manual prior to being designated as qualified airlift or combat airlift aircrew members.

c. Training flights will be conducted using requirements and maneuvers in accordance with MACR 51-1, and AFM 60-16/MACSUP 1. Normally, initial training flights for pilots will be conducted during daylight under VFR conditions in accordance with MACR 51-1.

1-4. Terms Explained (Not Duplicated in AFM 11-1):

a. *Airlift Aircrew.* Qualified to conduct an airlift mission. (Reference MACM 55-1.)

b. *Category II Qualified.* Qualified to make AWLS approach to FAA category II approach minimums.

c. *Combat Airlift.* The movement and delivery by strategic airlift aircraft of combat forces into a combat zone and the support of such forces by intertheater or intratheater lines of communication. Combat airlift includes deployment and redeployment of forces to or from the combat zone, airborne operations, and aeromedical evacuation of patients from a combat zone.

d. *Combat Airlift Qualified Crew.* A basic airlift crew (see MACM 55-1) whose members have completed an initial combat airlift training and qualification program.

e. *Continuation Training (Phase III).* Training required to maintain individual proficiency in accordance with AFM 60-1, MACR 51-1 and this regulation.

f. *Copilot.* A pilot who has upgraded from unqualified pilot status. Functions as a copilot on airlift missions.

g. *Combat Airlift Ready Crew.* A crew whose members are identified to maintain currency in combat airlift operations and are current in accordance with chapter 4 of this regulation.

h. *First Flight Engineer.* An aircrew member fully qualified to operate aircraft systems during the accomplishment of global airlift missions.

i. *Airlift Loadmaster.* An aircrew member fully qualified to function as a loadmaster on global airlift missions.

j. *Flight Nurse.* A nurse of the USAF Medical Service who holds the designation of flight nurse, possesses current aeronautical orders, and is assigned or attached to an aeromedical evacuation unit.

k. *Flight Examiner.* A fully qualified instructor aircrew member authorized to administer flight evaluations.

l. *Initial Checkout/Transition Training (Phase I).* Training necessary to fully qualify aircrew members to their basic aircrew positions.

m. *Instructor.* A fully qualified aircrew member authorized to impart instruction for his respective crew position.

n. *Lead Crew and Select Lead Crew.* These combat airlift qualified crews are explained in MACM 55-141, chapter 2, *C-141 Combat Airlift Operational Procedures.*

o. *Medical Technician.* An A902X0/A90292 of the USAF Medical Service who is required to

participate in frequent and regular aerial flights and is assigned or attached to an aeromedical evacuation unit.

p. *Mission Qualification and Upgrade Training (Phase II).* Training necessary to fully qualify aircrew members in the units' assigned mission and upgrade aircrew members to the next higher crew position.

q. *Navigator.* A navigator fully qualified to direct aircraft navigation on global airlift missions.

r. *Requalification.* Training necessary to requalify previously qualified personnel in their former aircrew position.

s. *Second Flight Engineer.* An aircrew member qualified to function under the supervision and aid of a first flight engineer.

1-5. Abbreviations Explained (Not Duplicated in AFM 11-2):

a. AWLS - All Weather Landing System
b. CAM - Combat Airlift Mission
c. FEAC - Flight Examiner Aircraft Commander
d. FEN - Flight Examiner Navigator
e. IAC - Instructor Aircraft Commander
f. TTU - Transition Training Unit

1-6. Training Records:

a. Training records will be maintained within each squadron training section in accordance with AFM 60-1 and MACR 51-1 on each individual aircrew member assigned and attached.

b. In accomplishing each phase of training, appropriate MAC forms will be used to record evaluation data obtained from the instructor's worksheet. These forms will be retained during the course of instruction to insure continuity of instruction.

c. When an aircrew member is reassigned, the losing organization will prepare a transcript of phase III training accomplished for the current training period, to be placed in section V of the individual's AF Form 846.

1-7. Administration. Organization commanders will establish a control system for distribution.

a. At least one copy of this regulation will be maintained in each C-141 squadron operations and aeromedical evacuation units attached to C-141 aircraft for flying. It will be readily accessible to operations and aircrew personnel.

b. Suggestions and recommendations for improvement or changes will be forwarded through channels to MAC/DOT on AF Form 847, *Recommendation for Change of Publication,* according to AFM 60-1 and appropriate MAC directives.

Chapter 2

INITIAL CHECKOUT/TRANSITION TRAINING (PHASE I)

2-1. Scope. This chapter contains the minimum training requirements to qualify C-141 aircrew members initially in their respective aircrew positions.

2-2. Applicability. The training course outlines establish the minimum number of training units and suggested sequence in which they will be presented by a MAC approved formal training agency, local FTD, or airlift unit.

SECTION A—AIRCREW GROUND TRAINING REQUIREMENTS

2-3. All Crew Members. Any crew member given C-141 transition training in the unit will have had equivalent training or will complete the following ground training (completion of the C-141 TTU at 443 MAWg satisfies this requirement):

a. Aeromedical Evacuation Indoctrination:
(1) Mission
(2) Aircrew responsibilities
(3) Aircraft configuration
(4) Allowable cabin load
(5) Medical crew complement
(6) Crash rescue equipment
(7) Refueling operations with patients aboard
(8) Operational procedures

b. Ground Egress Equipment Indoctrination (must be conducted at the aircraft prior to flight):
(1) Location of emergency equipment
(2) Location of emergency exits
(3) Escape routes
(4) Emergency signals
(5) Crew coordination

2-4. Pilot and Flight Engineer Ground Training:

a. Normally, academic training and flight simulator training preparatory to flight training of pilots and flight engineers will be accomplished by the 443 Military Airlift Wing, Altus AFB, Oklahoma, in accordance with curriculum approved under the procedures established in MACR 50-9, *MAC Formal Transition Training Unit (TTU).* Courses are listed in AFM 50-5, *USAF Formal Schools Catalog.*

b. Unit commanders using the "Secondary Method" for local transition established in MACR 51-1, will obtain and use currently approved TTU C-141 curriculum and course training standard. This curriculum will be part of that referenced in MACR 51-1, chapter 3, as the "appropriate 51-series publications" for the C-141 aircraft local transition course. Also, see paragraph 2-7 regarding secondary method flight transition training.

2-5. Navigator Ground Training:

a. Normally, academic training for navigator upgrade to C-141 aircraft will be accomplished by the 443 MAWg, Altus AFB, OK, in accordance with curriculum approved under the procedures established in MACR 50-9, *MAC Formal Transition Training Unit (TTU).* The TTU curriculum will include at least one orientation flight, during a normal student pilot local flight, to become familiar with navigator equipment location and to meet the ECM interference demonstration requirement of MACR 50-12, *Electronic Warfare Training.*

b. If it is necessary to use local transition training due to non-availability of the TTU resource, unit commanders will obtain and comply with the currently approved TTU C-141 curriculum.

2-6. Loadmaster Ground Training:

a. Loadmasters transitioning or initially training into the aircrew position will normally attend the 443 MAWg, A60770-2 Aircraft Loadmaster Transition Course (C-141).

b. Unit commanders requiring an alternate method for local transition training will obtain and use currently approved Course A60770-2 Curriculum and Course Training Standard. The alternate method of training requires MAC/DOT approval on an individual basis.

SECTION B—AIRCREW FLYING TRANSITION TRAINING REQUIREMENTS

2-7. Pilot and Flight Engineer Flight Transition Training. Satisfactory completion of flying training by pilots and flight engineers will be accomplished on an individual proficiency basis.

a. Normally, C-141 flight transition training of pilots and flight engineers will be accomplished

by the 443 Military Airlift Wing, Altus AFB, Oklahoma, in accordance with curriculum approved under the procedures established in MACR 50-9, *MAC Formal Transition Training Unit (TTU)*. Separate courses are listed in AFM 50-5 for pilots and flight engineers. In addition to flight transition, these courses include the ground school and flight simulator training referenced in paragraph 2-4.

b. Unit commanders using the "Secondary Method" for local transition established in MACR 51-1, chapter 3, will obtain and use currently approved TTU C-141 curriculum and course training standard for applicable course. This curriculum will consitute the course outline referenced in MACR 51-1, chapter 3, as the "appropriate 51-series publications" for the C-141 aircraft local transition course.

2-8. Navigator Flight Training:

a. Satisfy flight requirements outlined in MACR 51-1.

b. The number of transition hours will be dependent upon the progress and demonstrated proficiency of the student navigator. The outline for navigator flight training is attached (attachment 1).

2-9. Loadmaster Flight Training:

a. Satisfy training requirements as outlined in MACR 51-1.

b. The number of airlift missions required to transition or upgrade will be dependent upon the progress and demonstrated proficiency of the trainee. The loadmaster flight training outline will be used by instructors for training all loadmasters transitioning or initially upgrading in the C-141 aircraft. Trainees will receive training and be graded in each sub-area of the outline. Instruction in each sub-area will be repeated until the instructor is satisfied the trainee is fully knowledgeable and completely understands the item. The outline for loadmaster flight training is attached (attachment 2).

SECTION C—AEROMEDICAL CREW TRAINING REQUIREMENTS

2-10. Flight Nurse and Medical Technician Training Course Outline:

	Hours
Total Course	8:00
I. AIRCRAFT GENERAL	1:30
A. Description	
1. Course Introduction	
2. Aircraft Data	
a. Speed-cruise altitude	
b. Take-off-climb, descent, landing altitude	
c. Normal configuration	
d. Reconfiguration variations	
3. Cabin Features	
a. Medical crew seats/stations	
b. Baggage pallet	
c. Doors and emergency exits	
d. Medical supplies/equipment storage	
e. Crew galley and lavatory	
f. Comfort pallet	
(1) Galley	
(2) Rest rooms	
(3) Refrigerators	
(4) Water supply	
(5) Stowage	
g. Litter support system	
h. Waste receptacles placement	
i. Emergency equipment location	
B. Aircraft Tour	
1. Exterior Tour	
2. Interior Tour	
II. ENVIRONMENTAL SYSTEMS	1:30
A. Oxygen Systems	
1. Location/Operation/Use	
a. Medical Crew	
(1) Normal	
(2) Emergency	
b. Troop system (patient)	
(1) Therapeutic	
(2) Emergency	
c. Crew system	
(1) Recharger hoses	
B. Heating an Air Conditioning (Climate Control)	
1. Description and Operation	
2. Capabilities and Limitations	
3. Air Flow Distribution	
4. Humidity Limitations	
C. Pressurization. Capabilities, Limitations and Restrictions	
III. ELECTRICAL AND COMMUNICATION SYSTEMS	1:00
A. Electrical	
1. Voltage Sources	
2. Outlet Locations	
3. Ground/Inflight/Emergency Operations	
a. Medical equipment	
b. Safety considerations	
4. General and Emergency Lighting	
B. Communication Systems	
1. Public Address Systems	
a. Panel location	
b. Operation	
2. Head Set Use by MCD	

IV. ENPLANING AND DEPLANING PROCEDURES 1:00

A. Medical Crew Responsibilities
B. Vehicle Positioning
C. Litter Support System
1. General Description
2. Operation
D. Ambulatory/Litter Enplaning and Deplaning
1. Petal Door
2. Troop Doors
E. Safety Considerations
1. Patient/Personal Effects Secure
2. Equipment and Supplies Secure

V. EMERGENCY EQUIPMENT AND PROCEDURES 2:00

A. Emergency Signals
B. Emergency Equipment
1. Location
2. Operation
3. Precautions
C. Emergency Chop Out Areas
D. Ground Egress
E. Ditching
F. Fire/Smoke in Cabin
G. Rapid Decompression

VI. REGULATIONS, MANUALS AND TECHNICAL ORDERS 1:00

A. Air Force Regulations and Manuals
1. AFM 60-1, Flight Management Policies
2. AFR 164-1, Worldwide Aeromedical Evacuation
B. MAC Regulations and Manuals
1. MACR 51-1, Aircrew Training Program
2. MACR 51-141, C-141 Aircrew Training
3. MACM 55-1, Airlift Operations
4. MACM 55-4, C-141 Configuration/Mission Planning Manual.
5. MACR 92-3, Requirements and Procedures for Protection of Aeromedical Evacuation Aircraft
6. MACR 164-1, MAC Worldwide Aeromedical Evacuation
7. MACR 164-2, Patient Baggage Handling
8. MACR 164-5, Patient Manifest Procedures
C. TO IC-141A-1

2-11. Flight Nurse and Medical Technician Flight Training Requirements. See paragraph 3-1e.

Chapter 3

MISSION QUALIFICATION AND UPGRADE TRAINING (PHASE II)

3-1. Scope. This chapter establishes minimum criteria and training requirements necessary for upgrading aircrew members in their airlift and combat airlift mission roles. Upgrade evaluation flights will be scheduled only after recommendation by an instructor or a flight examiner. Aircrew certification upon completion of upgrading will be as directed in MACM 60-1, volume I:

a. The training missions outlined in this chapter establish the basic items to be covered during phase II training. Except where specifically stated otherwise, units may arrange mission sequence or sequence of items as necessary to use flying training hours effectively and accomplish the unit mission.

b. Pilots will complete phase I training prior to entering combat airlift training.

c. When participating in training missions other than JCS exercises or joint airborne air transportability training (JAAT), students may be utilized in their respective crew position provided the nonqualified crew position is supervised by an instructor or flight examiner. However, student loadmasters will be scheduled over and above the normal crew complement as outlined in MACM 55-1.

d. Phase II training for Flight Nurses and Medical Technicians will include meeting the initial mission qualification requirements of MACR 51-1.

SECTION A—BASIC MISSION QUALIFICATION

3-2. Time Period to Checkout. Aircrew members will be upgraded in their respective aircrew position, including combat airlift requirements if applicable, within the time period as specified in MACR 51-1.

3-3. Ground Training Requirements—Airlift. All aircrew members, before entering unit conducted phase II training will have satisfactorily completed applicable 443 MAWg (TTU) or MAC approved phase I ground training and initial ground training requirements of MACR 51-1, chapters 2 and 4. Before completing phase II training, aircrew members will complete a course of instruction in aeromedical evacuation as outlined in paragraph 2-3. Initial MAC Air Security (Anti-Hijacking) Training will be accomplished in accordance with MACR 50-14.

3-4. Flying Training Requirements—Airlift:

a. All aircrew members will complete phase I flight training requirements of this manual and those upgrade requirements specified in MACR 51-1.

b. After completing phase I ground and flight training, pilots without previous MAC experience will complete indoctrination in accordance with MACR 51-1 and a minimum of one actual overwater mission for familiarization with the unit's mission procedures. The pilot will be designated on the flight orders as copilot, with crew qualification as copilot unqualified (CPNQ), and under the supervision of a qualified pilot. As an alternate to this procedure, the pilot may be certified and used as a basic crew member (copilot qualified), provided the pilot in command is an instructor or flight examiner. Pilots with previous MAC experience are not required duty familiarization flights and may be used on their first airlift mission as qualified copilots.

c. Satisfactory completion of pilot upgrade flying training will be accomplished on an individual proficiency basis. A course of instruction based on eight hours at the controls of the aircraft is attached (attachment 4) for use in accomplishing this instruction.

3-5. Category II ILS Training. Training will be accomplished in compliance with category II landing minimums and aircrew qualification established in MACR 51-1. Completion of 443 MAWg transition school satisfies this requirement.

3-6. Instructor Upgrade Requirements. Aircrew members upgrading to instructor will meet the selection requirements outlined in MACR 51-1 and the evaluation requirements of MACM 60-1, volume I. Wing commanders of units designated as combat airlift may, at their discretion, direct instructors not identified as combat airlift ready crew members to become qualified in accordance with section B, this chapter, and maintain combat airlift currency in accordance with table 4-2.

3-7. Combat Airlift Familiarization Training. Pilots, navigators and loadmasters of units whose

mission includes formation, airdrop and low level navigation missions will complete a combat airlift familiarization program. Combat airlift familiarization training should be completed within the guidelines provided for combat airlift upgrade in table 3-2, MACR 51-1. This program is composed of:

a. *Ground Training:*

(1) Pilots and navigators will complete the ground training in paragraphs 3-9 and 3-11, respectively. This training will be given by qualified instructor or flight examiner personnel.

(2) Loadmasters will complete the C-141 loadmaster aerial delivery course outlined in MACR 50-24.

b. *Combat Airlift Observation Flight.* Pilots, navigators, and loadmasters will participate in an observation flight which will be recorded on the MAC Form 170c under the heading "CAM" Observation Flight P, N, LM."

SECTION B—COMBAT AIRLIFT READY QUALIFICATION

3-8. Combat Airlift Ready Force Structure. This paragraph applies only to personnel assigned to units having a mission which includes formation flying, airdrop, and low level navigation. Crew members who are identified as combat airlift ready crew members, all flight examiners, additional instructors as directed by wing commander (paragraph 3-6), supervisory personnel as required by paragraph 3-17, MACR 51-1, and replacements for the force structure will meet the requirements of this section and table 3-1.

3-9. Pilot Combat Airlift Ground Training. Reference materials are AFMs 3-3, 3-4; MACMs 55-40, 55-7, 55-141; MACR 51-1, and appropriate local training directives. The most qualified instructors/flight examiners will conduct combat airlift ground training. The following course of instruction will be completed prior to participating in combat airlift flight training:

a. *General knowledge:*
(1) Command structure
(2) Crew composition
(3) Supporting elements
(4) Aircrew mission planning aids
(5) Aircrew briefings
(6) DZ marking and restrictions
(7) Abort procedures
(8) Operational requirements and limitations

b. *Formation procedures and tactics:*
(1) Taxi, takeoff, and climb
(2) IFR formation
(3) VFR formation

c. *Low level navigation:*
(1) Flight planning and chart preparation
(2) Mission profiles and flimsies
(3) Techniques

d. *Airdrop:*
(1) Explanation of CARP terms and completion of worksheet
(2) Drop altitudes and airspeeds
(3) In-flight warnings and checklists
(4) Interphone procedures
(5) Explanation of personnel and heavy equipment airdrops
(a) Loadmaster duties
(b) Jumpmaster duties
(c) Aircraft configuration for personnel and heavy equipment airdrops
(d) Review of aerial delivery system
(e) Paratrooper exit
(f) Heavy equipment extraction process
(6) Explanation of personnel and heavy equipment emergency procedures

e. *Recovery:*
(1) Post drop IFR assembly
(2) IFR recovery
(3) VFR recovery

f. *Special procedures:*
(1) Corridor operation
(2) HALO

3-10. Pilot Combat Airlift Flight Training:

a. Aircraft commanders will complete the requirements of this paragraph, paragraphs 3-4, 3-9, 3-10c, and table 3-1 prior to completion of their combat airlift evaluation. All combat airlift training will be accomplished in accordance with MACM 55-141.

b. Copilots will complete the requirements of paragraphs 3-4, 3-9, and table 3-1 prior to completion of a CAM evaluation. In addition, copilots will:

(1) Demonstrate ability to maintain formation position from the right seat.

(2) Actually operate the ADS panel during each type of airdrop.

(3) Demonstrate proficiency in all other copilot duties during both day and night CAM operations.

c. Initial Qualification Training Outline:
(1) Preparation for flight
(a) Mission briefing
(b) Specialist briefing
(c) Pilot-loadmaster-jumpmaster briefing
(d) Crew briefing; navigators' airdrop briefing
(e) Preflight mission planning
1. Flight planning and preparation of charts

2. Review of route, DZ photographs/diagrams, and CARP with navigator
3. Confirm load, weight, and type of parachutes

(f) Aircraft preflight (forms, radios, publications)

(2) Engine start, taxi, takeoff, and climb
(a) Timing
(b) Taxi interval
(c) Availability of TOLD data, departure/approach procedures
(d) Navigational radios tuned, identified, and flight director set
(e) IFR takeoff and assembly
(f) VFR takeoff and assembly
(g) Abort procedures
(h) Timing to departure heading turn

(3) Enroute
(a) Station keeping
(b) IFR ascent/descent
(c) VFR join-up
(d) Orbit
(e) Weather penetration

(4) Low level procedures
(a) Orbit departure timing
(b) Low level navigation procedures
(c) Airspeed adjustment for time control
(d) Computation of slowdown point
(e) Checklist procedures
(f) Slowdown procedures

(5) Airdrop
(a) Positioning to CARP
(b) Personnel or type I training bundle
(c) Heavy equipment or type II training bundle
(d) Post drop
(e) Racetrack
(f) Emergency procedures

(6) Recovery
(a) Post drop IFR assembly
(b) IFR recovery
(c) VFR recovery
1. Overhead
2. Downwind

(7) Critique

d. Lead Training Outline. This training is in addition to that of paragraph 3-10c and is designed to qualify combat airlift qualified pilots in formation lead procedures and techniques. Lead pilot candidates will demonstrate the ability to lead a formation through those maneuvers listed under IFR formation, VFR formation, and transition maneuvers of table 3-1 prior to receiving a recommendation for evaluation. A minimum of a two aircraft formation will be used for this training.

(1) Preflight
(a) Conduct pilot specialist briefing
(b) Radio procedures/ATC clearances
(c) Taxi rate

(2) In-flight
(a) Orbit departure timing
(b) Low level navigation and time control
(c) Slowdown procedures
(d) Positioning to CARP
(e) Altitude and airspeed over the DZ
(f) Track across the DZ
(g) Aircraft control and stability
(h) Recovery procedures

(3) Conformation to time schedules
(4) Formation commands
(5) Debriefing

3-11. Navigator Combat Airlift Ground Training:

a. See paragraphs 2-5 and 3-7. Ground instruction introducing combat airlift navigation, CARP, and formation procedures are included in the transition course conducted by the 443 MAWg.

b. Navigators will complete the same course of instruction as pilots (paragraph 3-9) plus specialized instruction in the use of navigational computers, optional CARP techniques, countdown procedures, and other navigator duties, if paragraph 3-11a training was not completed within six months prior to their first combat airlift training flight.

3-12. Navigator Combat Airlift Flight Training:

a. Navigators will complete the requirements of paragraphs 3-4a, 3-9, 3-11, and table 3-1 prior to completion of their combat airlift evaluation. All training will be accomplished in accordance with MACM 55-141. Special emphasis will be placed on radar station keeping and pilot-navigator coordination. Navigator initial combat lead evaluations may be accomplished with one aircraft.

b. Initial Qualification Training Outline:

(1) Preparation for flight
(a) Mission briefing
(b) Specialist briefing
(c) Crew briefing; navigator airdrop briefing
(d) Preflight mission planning
1. Flight planning and preparation of charts, DZ photographs/diagrams, and CARD computations
2. Confirm load, weight, and types of parachutes

(e) Aircraft preflight (forms, navigational equipment, publications)

(2) Engine start, taxi, takeoff, and climb

(a) Countdown for engine start, taxi, and takeoff

(b) Use of radios for takeoff abort

(c) IFR takeoff and assembly

(d) VFR takeoff and assembly

(e) Timing to departure heading turn

(3) Enroute

(a) Use of navigational computers and radar as navigational aids

(b) Station keeping

(c) IFR ascent/descent

(d) VFR join-up

(e) Orbit

(f) Weather penetration

(4) Low level procedures

(a) Orbit departure timing

(b) Low level navigation procedures

(c) Airspeed adjustment for time control

(d) Computation of slowdown point

(e) In-flight warnings/checklist procedures

(5) Airdrop

(a) Positioning to CARP

(b) Personnel or type I training bundle

(c) Heavy equipment or type II training bundle

(d) Post drop

(e) Racetrack

(6) Recovery

(a) Post drop IFR assembly

(7) Critique

c. Lead Training Outline: This training is in addition to that of paragraph 3-12b and is designed to qualify combat airlift qualified navigators in formation lead procedures and techniques. Special emphasis will be placed on thorough chart preparation and in-flight map reading proficiency. A minimum of one hour is required for this mission.

(1) Preflight

(a) Conduct navigator's specialist briefing

(b) Prepare flimsies and briefing aids

(c) Preparation of flight plans, fuel planning and preflight CARP

(d) Timing procedures for stations, engine start, taxi, and takeoff

(2) In-flight

(a) Timing

(b) Low-level navigation and lead techniques

(c) Slowdown procedures

(d) Time over target

3-13. Loadmaster Combat Airlift Ground Training. Loadmasters entering training for combat airlift ready status will complete the C-141 loadmaster aerial delivery refresher course outlined in MACR 50-24 prior to beginning flight training.

3-14. Loadmaster Combat Airlift Flight Training:

a. The number of airdrops required to qualify the trainee for an upgrade evaluation will be as deemed adequate by the instructor but will not be less than three cargo airdrops and one personnel airdrop.

b. The trainee must pass a combat airlift written examination and complete all requirements of table 3-1 prior to completion of the CAM evaluation.

c. The outline for loadmaster flight training in aerial delivery procedures is contained in attachment 3.

TABLE 3-1

COMBAT AIRLIFT TRAINING INITIAL TRAINING REQUIREMENTS	Aircraft Commander			Copilot			Navigator			Loadmaster
	T	D	N	T	D	N	T	D	N	
AIRDROP TRAINING [1]										
Airdrop	4		1	2		1	4		1	4
Personnel	1			1			1			1
Equipment	1			1			1			3
IFR FORMATION										
Takeoff and Assembly	2						2			
Descent	2						2			
VFR FORMATION [2]										
Takeoff and Assembly	2	1	1							
Low Level Route [2]	6	2	2	2	1[3]	1[3]	6	2	2	
Slowdown	6	2	2				2	1	1	
Overhead Recovery	4	1	1							
TRANSITION MANEUVERS										
Post Drop IFR Assembly	2						2			
Orbit	1						1			
MISCELLANEOUS										
Written Examination [4]	1			1			1			1
Adv LM Air Del Crse										1
EVALUATION FLIGHTS										
Formation and Airdrop	1			1			1			2[5]
Formation Lead (Lead Crew)	1						1			

T - Total
D - Day
N - Night

NOTES:

1. Airdrop requirements for pilots and navigators may be satisfied by dropping appropriate type training bundles. Copilots will accomplish all required right seat duties and actuate the ADS panel for each type drop. All required drops for loadmasters must be actual including equipment and personnel.

2. Formation sorties and low level routes will be a minimum of 20 minutes. They may be accomplished concurrently.

Table 3-1 (continued)

3. Copilots will demonstrate the ability to maintain formation position from the right seat during required formation maneuvers.

4. Written examination will be administered within a five-month period prior to combat airlift evaluation. Applicable portions of AFMs 3-3, 3-4, MACMs 55-40, 55-141, and 55-7 will be included in each exam for appropriate crew positions.

5. Loadmaster evaluation flights will include one actual platform equipment drop and one actual personnel drop. Examinees will demonstrate proper multiple platform rigging procedures prior to evaluation flight. The aircraft will be re-rigged for single platform drop prior to the Air Force station time.

Chapter 4

CONTINUATION TRAINING (PHASE III)

4-1. Scope. This chapter provides guidance for aircrew members to maintain currency and proficiency in their respective aircrew positions.

4-2. Continuation Training Requirements:

a. *Airlift.* All aircrew members will accomplish the requirements outlined in AFM 60-1 and MACR 51-1. Pilots and flight engineers will attend simulator refresher training in accordance with MACRs 51-1 and 50-8. The simulator refresher course is outlined in attachment 5. Recurring MAC Air Security (Anti-Hijacking) Training will be accomplished in accordance with MACR 50-14.

b. *Combat Airlift.* Only combat airlift crew members identified as combat airlift ready are required to maintain CAM currency. Wing commanders of units with a combat airlift mission may, at their discretion, direct other aircrew members to maintain combat airlift currency. Select lead crews will maintain *quarterly** currency in accordance with table 4-1. All other combat airlift ready crew members will maintain *semiannual** currency in accordance with table 4-2. All pilot, navigator, and loadmaster flight examiners of units with a combat airlift mission will maintain at least semiannual currency. EXCEPTION: Unless identified as combat airlift ready, flight simulator instructors and flight examiners assigned to simulator on primary duty basis are not required to maintain combat airlift currency. The select lead pilots and navigators will fly an airdrop mission over a strange route and drop zone a minimum of once each calendar quarter (see table 4-1, Select Lead Crew). Two pilots and two navigators may take credit for the strange route concurrently. At least two of the four annually required missions will be night missions. Also, the select lead pilots and navigators will lead a formation consisting of two or more elements once each calendar quarter. (Two pilots and two navigators may take credit for these maneuvers simultaneously.) Pilots and navigators will not fly the same route or the same DZ axis (approach) more than once each 12 calendar months to fulfill the strange route requirement.

*NOTE: Semiannual currency periods are 1 January through 30 June and 1 July through 31 December. Quarterly currency periods are 1 January through 31 March, 1 April through 30 June, etc. Crew members not identified to maintain combat airlift currency will be considered current during the semiannual period in which initially qualified plus one additional semiannual period provided table 4-2, note 3 has been met. If table 4-2 requirements are not met during the additional period, crew members will not be scheduled on combat airlift missions.

(1) *Crews.* Simultaneous credit for an airdrop will be limited to the aircraft commander, copilot, navigator, and the two loadmasters required. EXCEPTION: Flight examiners and instructors may log up to 50 percent of their currency while performing examiner or instructor duties.

(2) *Pilots.* Instructor pilots and flight examiners may take credit for airdrops and formation maneuvers while instructing or evaluating a student on combat airlift missions. Airdrops and maneuvers credited by instructors or flight examiners while instructing or evaluating may be used to satisfy not more than half the requirements of tables 4-1 and 4-2. Aircraft commanders and copilots may take credit concurrently for all currency requirements, provided they are occupying their respective crew positions during the event.

(3) *Navigators:*

(a) Airdrops credited toward continuation training requirements will be within the confines of the established drop zone but not to exceed an area 700 yards wide and 600 yards long with the designated point of impact as its center. Additionally, lead navigators will not have a TOT error of more than plus or minus 120 seconds. Only one circular error will be credited for each CARP solution. For each CARP release, a circular error will be recorded for lead. All wing-man airdrops will be scored as satisfactory or unsatisfactory based upon the above criteria. When equipment malfunctions occur, the resultant circular error will not be included in the Circular Error Record.

(b) Instructor and flight examiner navigators may take credit for airdrops and formation maneuvers while instructing or evaluating a student on combat airlift missions. Airdrops and maneuvers accomplished may be used to satisfy not more than half the requirements of tables 4-1 and 4-2. Drops credited by flight examiners or instructors will be completed on MAC Form 853, annotated on MAC Form 207 as "Currency Drop," and will not be applied

toward FEN/IN Circular Error Average (CEA).

(4) *Loadmasters:*

(a) Instructor and flight examiners may take credit for up to 50 percent of their currency requirements when instructing or evaluating. Loadmasters will not be credited for training bundle airdrops.

(b) Each unit will maintain a record of all continuation airdrop training accomplished by loadmasters.

c. *Flight Engineers.* Flight engineers will maintain proficiency in performance data and C-141 aircraft systems by annually attending FTD course 4AFF43570C-6, Flight Engineer Technician (Refresher, C-141). The eligibility period for this training is the six-month period following the end of an individual's birth month. This course must be completed prior to the annual simulator course. This training will be recorded on MAC Form 170.

(1) Flight engineers assigned to the 443 MAWg are exempt from this requirement. The 443 MAWg will establish procedures to insure continual flight engineer proficiency. Documentation of the MAC Form 170-series is authorized for this purpose.

(2) Wing simulator instructors and flight examiners may satisfy this requirement by attending the performance portion of FTD course 4AFF43570C-6.

(3) Reserve associate flight engineers will be authorized to complete the FTD training subsequent to simulator training if course scheduling and trainee availability so dictate. In any event, FTD training must be completed within the established eligibility period.

d. *Medical Crew Members.* Flight nurses and aeromedical evacuation technicians will accomplish the requirements outlined in MACR 51-1. The unit commander will be responsible for establishing and supervising a continuing medical training program for aeromedical evacuation crew members. A qualified flight nurse and a senior A902X0 or A90292 will be designated by the unit chief nurse to be responsible for conducting this training program.

(1) *Flight Nurses' Training Program.* This training will review those diseases which might manifest signs and symptoms peculiar to physiology of flight. Attention should be directed toward a thorough understanding of the more common acute medical problems which occur in aeromedical evacuation and management of medical emergencies. The training schedule should provide for a minimum of one training period per month with make-up periods as required. Specific time for each subject will be governed by the experience level of the class. Subject matter will include those medical and nursing areas identified by the chief nurse and flight nurse examiners as requiring additional review and study. Recommended subjects are:

(a) The in-flight management (to include action during and after a rapid decompression) of patients with:

1. Pulmonary diseases and use of pulmonary equipment.
2. Cardiovascular diseases and use of cardiac monitor and/or ECG.
3. Renal diseases.
4. Severe burns.
5. Psychiatric disorders to include use of drugs, their contraindications, and reactions.
6. Head and spinal cord injuries and demonstration of the stryker frame and Collins traction.
7. Severe chest and orthopedic injuries to include demonstration of intermittent suction devices, underwater seal drainage, and limb traction devices.

(b) Isolation techniques in the aircraft environment; standard and reverse isolation and decontamination of aircraft.

(c) Fluid therapy-intravenous infusion, blood transfusions, and electrolyte balance.

(d) Management of acute pediatric conditions to include demonstration of the incubator and isolette.

(e) Emergency drugs - use and dosage for adult and pediatric emergencies.

(f) Pre- and post-operative care of organ transplant donors and recipients.

(g) When possible, the above training will be supplemented by participation in the local hospital's professional inservice and staff development programs.

(2) *Medical Service Specialists/Technicians/Superintendent Training Program.* This training will be designated to provide instruction in the medical and surgical conditions and problems relative to in-flight patient management. The training schedule should provide for a minimum of one period of instruction per month, with make-up periods as required. Specific time for each subject will be governed by the experience level of the group. Subject matter will include those areas identified by the chief nurse, NCOIC of in-flight medical care (IMC), and medical technician examiners as requiring additional review and study. When scheduled subjects are appropriate, flight nurse and medical technician training may be combined. Recommended subjects are:

(a) Nursing procedures for patients in flight.

(b) Shock, cause, recognition, and treatment.

(c) Psychiatric diseases - types, care, medications, and special in-flight problems.

(d) Rapid decompression.

(e) Respiratory disease - in-flight emergencies and their management.

(f) Medical in-flight emergencies.

(g) Cardiovascular conditions and their relation to aeromedical evacuation.

(h) Head and spinal cord injuries and intensive care required in flight.

(i) Fractured jaw-problems which may occur in flight.

(j) Burns - types and emergency treatment.

(k) Orthopedic problems.

(l) Obstetrical problems.

(m) Artificial respiration and resuscitation.

(n) Oral and parenteral medication.

4-3. Failure to Meet Currency Requirements. Training to requalify aircrew personnel to competence required for currency and certification will be accomplished in accordance with AFM 60-1, as supplemented, and MACR 51-1, chapter 3.

a. *Airlift.* Aircrew members will accomplish the currency requirements outlined in MACR 51-1. An aircrew member failing to meet these requirements will not be scheduled on any mission except under the supervision of an instructor or flight examiner until first regaining currency in his airlift specialty. Pilots delinquent in quarterly or monthly approach or landing requirements will not be scheduled on operational missions until the delinquent items are satisfied in accordance with MACR 51-1.

b. *Combat Airlift.* Aircrew members who fail to meet the provisions of this chapter will not be scheduled on combat airlift missions as a primary crew member until currency is regained. Currency may be regained under the following rules:

Rule 1: Loss of quarterly currency. A select lead crew who fails to meet requirements of table 4-1 will be removed from select lead status and a report forwarded through channels to MAC (DOX/DOT) explaining reason for failure to meet requirements. Select lead status may be regained by successful completion of a combat airlift evaluation. The evaluation will include the performance of that item which caused the loss of select lead status. If the crew member has met semiannual requirements of table 4-2, he may be considered current for the remainder of the semiannual period following the date on which quarterly currency was lost. (*Example:* A crew member satisfies quarterly requirements during the first quarter but fails to complete requirements during the second quarter. He becomes non-current on 1 July. If semiannual requirements were met during the period 1 January-30 June he is current for the period 1 July-31 December, provided note 3, table 4-2, have been met).

Rule 2: Loss of semiannual currency. Currency may be regained by accomplishing all delinquent items under the supervision of an instructor or flight examiner. Currency may also be regained by completing a flight evaluation which includes the events which caused loss of currency. If currency was lost for airdrops, the flight evaluation may include only one airdrop provided it is of the type which caused loss of currency. Flight examiner personnel who fail to maintain semiannual combat airlift currency will not perform examiner duties on any mission until currency is regained in accordance with this rule. EXCEPTION: Unless identified as combat airlift ready, flight simulator instructors and flight examiners assigned to simulator on primary duty basis are not required to maintain combat airlift currency.

Rule 3: Non-current status exceeding 180 days. Crew members who remain non-current for a period exceeding 180 days must accomplish retraining on a proficiency basis prior to being requalified in combat airlift tactics.

4-4. Combat Airlift Training Record, MAC Form 207:

a. The MAC Form 207 provides a record of combat airlift training requirements accomplished by individual crew members after they have attained a combat airlift qualified status. This form may be used during the period of upgrade to combat airlift qualification; however, appropriate entries will also be contained in the MAC Form 21-series. MAC Form 207 will be used in lieu of MAC Form 853.

b. Subcommands will overprint MAC Form 207 only to reflect specific unit combat airlift training requirements.

c. Maintaining the MAC Form 207.

(1) A MAC Form 207 will be initiated for each aircrew member required to be combat airlift qualified.

(2) The MAC Form 207 will be posted and maintained by the unit training section in a looseleaf binder. When all blank spaces of a column for a specific requirement have been filled, a new form will be initiated. The old form will be attached to the new form. The following information will be transcribed to the new forms:

(a) All entries contained in the INIT COMPL/QUAL section and the ANNUAL RQMTS section.

(b) Only those entries in the QUARTERLY RQMTS section and the QUARTERLY AIRDROPS that pertain to the individual's present currency requirement.

(c) Lead navigators CEA for the last ten applicable drops; those for which a CE was given.

(d) Those items and entries contained in the OTHER CMBT TNG section will be transcribed as directed by the unit commander.

(3) All entries on the MAC Form 207 may be made in pencil.

(4) If the crew member is transferred within MAC, the current MAC Form 207 will be removed from the looseleaf binder and filed in section V, AF Form 846, prior to transfer. If the crew member is transferred to a non-MAC unit, the current MAC Form 207 will be given to the individual.

d. How to complete MAC Form 207:

(1) INIT REQUIREMENTS—enter the date the individual initially completed the listed requirements or was initially qualified in applicable crew position.

(2) ANNUAL RQMTS—enter the date applicable annual requirements were satisfied.

(3) CURRENCY RQMTS—(NOTE: Check appropriate "Semiannual" or "Quarterly" block to indicate currency period and enter calendar year). Enter the day and month of accomplishment at the top of the appropriate column and enter opposite the applicable requirements and the number of times the requirement was accomplished.

(4) NAME (last, first, middle initial)—self-explanatory.

(5) DOB—enter individual's birth month.

(6) GRADE—self-explanatory.

(7) SQUADRON—self-explanatory.

(8) CREW POSITION—enter the crew position in which the individual is qualified to function in (AC cmbt alft qual, CP combt alft qual).

(9) CEA - LAST 10 DROPS—enter for lead navigators the "Circular Error Average" for the last ten applicable drops.

(10) STATUS (current/non-current)—enter present status. The letters C or NC may be used. If NC, enter the date of non-currency and reason.

(11) DATE OF LAST FLIGHT—enter date of last combat airlift flight used to meet the quarterly *Combat Airlift Mission* requirement.

(12) CURRENCY—AIRDROPS—enter the date of accomplishment in the DATE column. Enter the number of completed passes where the drop is scored in the Day (D)/Night (N) column. (For navigators, circular error must be in accordance with paragraph 4-2b(3)(a).)

(13) DROP CE/TOT—enter the circular error for each drop scored with a CE and enter deviation from planned time over target in ± seconds, for example; 75/+3 (lead navigators only).

(14) OTHER CMBT TNG—enter the date of accomplishment at the top of the appropriate column and enter opposite the applicable requirement the number of times the requirement was accomplished. Units may overprint this section to add local combat airlift training requirements.

e. *Automated Report.* When the AAMS automated report, *CAM Currency Accomplishments,* is available, it may be used in place of the MAC Form 207. These reports will be filed in binders by crew position.

Table 4-1

SELECT LEAD CREW COMBAT AIRLIFT CURRENCY REQUIREMENTS (see paragraph 4-2b)	Pilot		Navigator		Loadmaster
AIRDROP (Quarterly) [1]					
Total [1]	3		3		2
Personnel					1
Equipment					1
Night (Personnel or Equipment)	1		1		
IFR FORMATION (Quarterly)					
Take-off and Assembly	1		1		
Descent	1		1		
VFR FORMATION (Quarterly) [2]	Day	Nite	Day	Nite	
Take-off and Assembly	1				
Low Level Route [2]	1	1	1	1	
Slowdown	1	1	1	1	
Overhead Recovery	1	1			
TRANSITION MANEUVERS (Quarterly)					
Post Drop IFR Assembly	1		1		
VFR Orbit Assembly	1		1		
OTHER QUARTERLY					
Strange Route/DZ	1		1		
Formation of 2 or more elements	1		1		
ANNUAL REQUIREMENTS					
Written Exam [4]	1		1		1
LM Air Del Cse (Refresher) [5]					1
Evaluation Flight	1		1		1

NOTES:

1. Airdrops for pilots and navigators may be type I or type II training bundles. Copilots will perform all right seat duties including actual operation of the ADS panel. Required drops for loadmasters must be actual equipment and personnel.

2. Formation sorties and low level routes will be of sufficient length to insure timely completion of all required checklists, normally 20 minutes. They may be accomplished concurrently. Copilots will hand fly the aircraft and maintain formation position from the right seat for a minimum of five minutes.

3. Number not used.

Table 4-1 (continued)

4. Written examination will be administered prior to combat airlift evaluation flight. Applicable portions of AFM 3-3, AFM 3-4, MACMs 55-40, 55-7, and 55-141 will be included in each examination for appropriate crew positions. If a no-notice CAM evaluation is used to satisfy the annual CAM requirement, the written examination will be administered within 30 days after the no-notice evaluation.

5. Course outlined in MACR 50-24. Loadmasters will complete the aerial delivery refresher course annually during the period five months prior to end of birth month.

Table 4-2

COMBAT READY CREWS CURRENCY REQUIREMENTS (see paragraph 4-2b)	Aircraft Commanders		Copilots		Navigators		Loadmasters
AIRDROP [1] (Semiannual)							
Total	3		2		3		3
Personnel	1		1		1		1
Equipment	1		1		1		2
Night (Personnel or Equipment)	1				1		
IFR FORMATION (Semiannual)							
Take-off and Assembly	1				1		
Descent to Low Altitude	1				1		
VFR FORMATION [2] (Semiannual)	Day	Nite	Day	Nite	Day	Nite	
Take-off and Assembly	1						
Low Level Route [2]	1	1	1	1	1	1	
Slowdown	1	1			1	1	
Overhead App/Lng	1	1					
COMBAT ALFT MISSIONS [3] (Quarterly)	1		1		1		1
TRANSITION MANEUVERS (Semiannual)							
Post Drop Assembly	1				1		
Orbit	1				1		
LEAD CREW [3]	1				1		
ACADEMIC REQUIREMENTS							
Written Exam [4] (Annual)	1		1		1		1
LM Ref Air Del Crse [5]							1
EVALUATION FLIGHTS (Annual)							
Formation and Airdrop	1		1		1		1
Formation Lead (Lead Crew)	1				1		

NOTES:

1. Airdrops for pilots and navigators may be type I or type II training bundles. Copilots will perform all right seat duties, including actual operation of the ADS panel. Required drops for loadmasters must be actual equipment and personnel.

2. Formation sorties and low level routes will be of sufficient length to insure timely completion of all required checklists, normally 20 minutes. They may be accomplished concurrently. Copilots will hand fly the aircraft and maintain formation position from the right seat for a minimum of five minutes.

Table 4-2 (continued)

3. Each crew member must occupy a primary crew position on a combat airlift mission once each calendar quarter; however, except for loadmasters, no specific minimum maneuvers need be accomplished. For loadmasters, this must include an actual (personnel or equipment) airdrop. Navigator or loadmaster instructors or flight examiners, performing duties as instructors or flight examiners, satisfy this requirement.

4. Written examination will be administered prior to combat airlift evaluation flight. Applicable portions of AFMs 3-3, 3-4, MACMs 55-40, 55-7, and 55-141 will be included in each examination for appropriate crew positions. If a no-notice CAM evaluation is used to satisfy the annual CAM requirement, the written examination will be administered within 30 days after the no-notice evaluation.

5. Course outlined in MACR 50-24. Loadmasters will complete the aerial delivery refresher course annually during the period five months prior to end of birth month.

PAUL K. CARLTON, *General, USAF*
Commander

HIRAM GRIFFIN, *Colonel, USAF*
Director of Administration

Summary of Revised, Deleted, or Added Material

Publication changed from manual to regulation in accordance with administrative policies. This revision consolidates seven published changes to MACM 51-141. Additionally, chapter 3 is rewritten both in organization and text to align with revised procedures applicable to combat airlift crews. Paragraph 4-3a is changed to restrict pilots delinquent in approach or landing requirements from being scheduled from operational missions. Engine running loading procedures have been removed from CAM and included in airlift training, with reference to TO -1 vs MACM 55-141 (deleted Tables 3-1, 4-1, 4-2, Atch 3 "Q"; added attachment 2VQ and attachment 5, Part I, 12d.) Chapters 5 and 6 deleted since covered in Dash One or other publications; is or can be taught in 443 MAWg (TTU).

NAVIGATOR FLIGHT TRAINING COURSE

Reference text, paragraph 2-8.

NOTE: This lesson plan is an expanded MAC Form 21d to be used as an instructor aid and to assist students in gaining proficiency in overwater navigation.

A. Preparation for Flight
1. Possess required personal and navigation equipment
2. Review briefing materials and NOTAMS
3. Analyze weather data for flight planning
4. Prepare and review flight plans
5. Perform aircraft equipment preflight

B. Basic Navigation Procedures
1. Chart preparation and maintenance
a. Plotting tracks and positions
b. Measuring bearings and distances
2. Proper use of hand held computer (MB-4, etc.)
a. Computing speed, time, and distance problems
b. Temperature, altitude, and airspeed computations
c. Wind computations
3. Flight instrument utilization
a. TAS meter
b. Altimeter
c. BDHI
4. Maintenance of flight records and charts
a. Log procedures
b. Flight plan
5. Adherence to checklist
a. Normal procedures
b. Emergency procedures
6. Approach and departure monitoring
a. Terrain avoidance
b. Weather avoidance
c. Use of SID, terminal plates, and area charts
7. Know and use Flight Information Publication
a. Planning section
b. En route supplements
c. Enroute charts
d. ICAO procedures
8. Maintain prescribed ETA and course tolerances

C. Celestial
1. Proper care and use of sextant
2. Proper and accurate use of Air Almanac
3. Proper and accurate use of HO 249 tables
4. Body selection, sighting, and plotting
5. Complete heading check (as required)

D. Loran
1. Scope and display interpretation
a. Station selection
b. Receiver alignment
c. Lock-on procedures
d. Sky-ground wave determination
e. RF reject
2. Corrections; as needed
3. Plotting of LOP's

E. Radar
1. Receiver adjusted for optimum operation
2. Scope adjusted for optimum operation
3. Scope interpretation
a. Mapping
b. Terrain avoidance
c. Weather
4. Fix positioning
a. Azimuth stabilized
b. Az stab off

F. Radio
1. Tuning and station identification
a. ADF
b. VOR and TACAN
2. LOP plotting
a. Corrections applied
b. Accuracy
3. HF for time back
4. Consol/Consolan
a. Identification
b. Counting and plotting

G. Navigation Computers
1. Programming
a. ASN-24
b. ASN-35
2. Updating ASN-35 and application of corrections
3. Updating ASN-24
a. Automatic updating
(1) Radar
(2) Tacan
(3) Loran
(4) Wind Between Fixes
b. Manual updating
(1) Celestial
(2) Visual
4. General knowledge of equipment capabilities
a. Reprogramming for diversions

b. Malfunction of conversion modules
(1) Detection
(2) Corrective actions
c. Coupling to flight director
d. Approach/departure monitoring
e. Deviation corrections

H. Specialized Equipment
1. Doppler radar use and limitations
2. VERNAV
a. Self test
b. Programming
c. Use

I. Grid
1. Knowledge of grid procedures
2. Application of grid procedures
3. Use of computers in grid operations
a. Polar
b. Subpolar

J. General
1. Satisfactory aircrew coordination
2. Adequate pacing procedures
3. Knowledge and practice of safety procedures
4. Knowledge and application of emergency procedures
a. Fire
b. Ditching
c. Emergency depressurization
d. Crash landing
e. Airborne egress
f. Ground egress
5. AIREP preparation and weather debriefing
6. AFTO Form 781 review and entries
7. Knowledge and use of authentication procedures
8. Maintain required manuals and directives

K. Special Requirements: Cold Signal Operations
1. Knowledge of operation
2. Demonstration of proper operating procedures
3. Demonstration of proper ARA procedures

LOADMASTER FLIGHT TRAINING COURSE (PHASE I)

Reference text, paragraph 2-9.

I. PREDEPARTURE PROCEDURES
- A. Preflight Procedures
  - 1. Use of checklist
  - 2. Review of AFTO Form 781
  - 3. Preflight inspections
    - a. Exterior inspection IAW TO 1C-141A-1
    - b. Interior inspection IAW TO 1C-141A-1
    - c. Comfort pallet inspection
      - (1) Maintenance status
      - (2) Pallet restraint
      - (3) Flush line
      - (4) Vent line
      - (5) Water tank
      - (6) Circuit breaker
      - (7) Buffet
      - (8) Latrines
- B. Aircraft Systems Operation
  - 1. Crew entry door
  - 2. Auxiliary power equipment
    - a. External power
    - b. Auxiliary power unit (APU)
  - 3. Electrical system
    - a. External power source
    - b. Auxiliary power unit source
    - c. Aircraft source
  - 4. Lighting system
    - a. Guarded cargo compartment dome light switch
    - b. Cargo compartment light switch
    - c. Cargo compartment dim-bright switch
    - d. Dimming rheostats
    - e. Personnel warning signs
    - f. Ramp loading lights
  - 5. Hydraulic System No. 3
    - a. Applicable items operated by No. 3 system
    - b. Ramp control switches
  - 6. Intercommunication & Public Address System
    - a. Power switch
    - b. Circuit breakers
    - c. Speaker selector switch
    - d. Public address switch
    - e. Interphone panels
  - 7. Fuel System
    - a. Fuel gauges
    - b. Allowable fuel weight
  - 8. Oxygen System
    - a. Oxygen manual shut-off valve
    - b. Troop oxygen quantity indicators
    - c. Indicator lights bright-dim switch
    - d. Oxygen lights and horn test switch
    - e. Low oxygen quantity lights
    - f. Oxygen regulators
    - g. Therapeutic oxygen valve
    - h. Troop oxygen masks
    - i. Centerseat oxygen distribution
  - 9. Aft Cargo Doors, Pressure Door and Ramp System
    - a. Door arming switch
    - b. Auxiliary pressure door latches and cam jacks
    - c. Auxiliary ramps
    - d. Door warning light
  - 10. Paratroop Doors
    - a. Locking and unlocking handle
    - b. Booster lever
    - c. Lifting handle
    - d. Door warning light
  - 11. Flight Crew Galley
    - a. Main power switch
    - b. Circuit breakers
    - c. Buffet lights
    - d. Coffee maker
    - e. Oven
    - f. Hot cup
    - g. Refrigerator
    - h. Water tank
    - i. Refuse container
  - 12. Latrine Facilities
    - a. Circuit breakers
    - b. Lavatory lights
    - c. Wash water tank
    - d. Waste water tank
    - e. Wash basin
    - f. Toilet
    - g. Refuse container
    - h. Oxygen bottle and mask
  - 13. Restraint Rail Systems
    - a. Installation of rails and roller conveyors
    - b. Inspection of rails and roller conveyors
    - c. Operation of rails
- C. Preplanning and Arrangement
  - 1. Preliminary DD Form 365F
    - a. Allowable load
  - 2. Cargo/troop load planning (TO 1C-141A-9)
    - a. The total C.G. location on aircraft
    - b. Placement of dangerous materials
    - c. Loading sequence considering onload, offload and jettison

d. Total load C.G. compared to total load C. G. location on aircraft
e. Compartment load limits
f. Floor load limits
g. Final load configuration
3. Use of loading charts and graphs
4. Shoring requirements
D. Inspection of Cargo
1. Dangerous materials for compatibility, marking and labeling
2. Classified, biologicals, blood and perishables
3. Remains of deceased personnel
4. Emergency & valuable shipment
5. Ordinary mail, registered mail and MAC pouches
6. General and concentrated cargo loading preparation (TO 1C-141A-9)
7. Vehicle preparation (TO 1C-141A-9)
8. Palletized cargo
a. Proper net configuration
b. Proper attachment of nets to pallets
c. Proper height of cargo
9. Equipment examined for mud, soil, snails or other plant pests
E. Loading Operations
1. Aircraft preparation and configuration
2. Proper positioning of doors and ramps
3. Positioning of stabilizer struts
4. Proper use of loading aids
a. General winching
b. Portable electric winch
c. External winching vehicle
d. Self-winching
e. Prybar
5. Briefing of loading crews
6. Hand signals and safety measures
7. Shoring application
8. Supervision of loading operations
9. Load placement
10. Cargo loading (palletized) (TO 1C-141A-9)
11. Cargo loading (floor load) (TO 1C-141A-9)
12. Vehicle loading (TO 1C-141A-9)
13. Personnel Loading (TO 1C-141A-9)
F. Tiedown and Restraint
1. Operation of restraint rails
2. Tiedown restraint computation
a. Number of restraint devices
b. Application of restraint devices with proper floor and plan angles to satisfy restraint criteria for load
3. Installation of barrier net
G. Troop Seat and Oxygen Mask
1. Seat installation and operation
a. Sidewalk seats
b. Aft facing seats
2. Safety belt installation
3. Oxygen mask installation
a. Sidewalk seats
b. Centerline seats
c. Aft facing seats
H. Fleet Service Supplies
1. Proper amount
2. Inspection of items
3. Completion of Fleet Service Checklist, MAC Form 12
4. Stowage of supplies
5. Control of equipment
6. Aircraft Interior Cleaning Checklist, MAC Form 79
I. Weight and Balance Calculations
1. Completion of DD Form 365F
a. Weight limitations
b. C.G. limitations
c. Cargo load limitations
d. Remarks section
2. Disposition of DD Form 365F
J. Jettison Posture
1. Location and accessibility of dangerous material
2. Briefing of Aircraft Commander
3. Jettison plan
K. Troop Handling
1. Boarding procedures
a. MAC Boarding Pass/In Flight Meal Receipt for Crews, MAC Form 124a
b. Sequence of boarding
2. Troop departure briefing
L. Departure Documents
1. Manifests
2. DD Form 365F
3. Special handling certification/receipt
4. MAC Form 12
5. Custom forms
6. Transportation control movement documents
M. Before Taxi Duties
1. Aircraft secure
a. Entrances/exits closed
b. Loose equipment tied down
2. Stowaway check
3. Cargo compartment temperature stabilization curtain installed (if required)
N. Public Health Service
1. Spraying of aircraft
a. When to spray
b. Type of insecticidal aerosol
c. Areas to spray
d. Length of spraying time
2. Immunizations

II. INFLIGHT PROCEDURES
A. Checklist Operations
1. Checklist used
2. Checklist items completed

B. Interphone Operations
1. Terminology
2. Clearing off headset
C. Scanning
D. Load Monitoring
1. Cargo leakage and fumes
2. Restraint tiedown inspection
E. Troop Control
1. Cabin discipline
2. Smoking restriction
3. Use of seat belts
4. Flight information
5. Inflight briefings
6. Troop movement
7. Descent briefing
F. Troop Comfort Items
1. Blanket and pillows
2. Latrine facilities
3. Temperature control
4. Lighting
G. Meal Service
1. Inflight schedule
a. Normal meal hours
b. Turbulent weather
2. General beverage service
3. Disposal of fresh fruit and other foods
4. Inflight meal accounting
a. Request for Flight Meals, AF Form 463
H. Food Preparation
1. Galley and comfort pallet cleanliness
2. Operation of galley and comfort pallet equipment
3. Tray setups
I. Galley, Comfort Pallet and Aircraft Cleanliness
J. Oxygen Monitoring
1. Walk around bottles
2. Troop oxygen quantity
K. Border Clearance
1. Border clearance forms
2. Custom declarations
a. General Declaration, Custom Form 7507
b. Customs Declaration, AF Form 653
c. Applicable custom declaration for various countries
3. Agricultural Requirements
a. Perishables collected
L. Document Preparation
1. DD Form 365F
2. Traffic Transfer Receipt AF Form 127
3. Cargo and mail manifests
4. MAC Form 12
5. MAC Form 221, Load Data

III. POSTFLIGHT
A. Agricultural Requirement
1. Opening of aircraft doors
2. Disposal of perishables, fresh fruit, peels and vegetables
B. Documentation
1. Manifests
2. Retention of receipts
C. Troop Offload
1. Troop briefing
2. Offload procedures
D. Cargo Offload Operation
1. Special handling or receipted items
2. Proper positioning of doors and ramps
3. Availability and serviceability of offloading equipment
4. Removal of obstructions from cargo floor
5. Proper ventilation
6. Proper brake function and air pressure of vehicles being offloaded
7. Briefing of offloading crews
8. Proper use of offloading aids
9. Hand signals and safety measures
10. Supervision of offloading operations
E. Equipment Stowage
1. Proper location
2. Properly secured; all containers latched
F. Thru Flight Briefing
1. DD Form 365F
2. Special remarks for outbound crew
G. Maintenance Status
1. Entries in AFTO Form 781
H. Aircraft Secure

IV. KNOWLEDGE OF AIRCRAFT
A. Danger Areas
1. Noise level
2. Temperature
3. Exhaust velocity
B. Entrance and Access Ladders
1. Crew entrance door
a. Opening and closing from outside aircraft
b. Opening and closing from inside aircraft
2. Paratroop doors
C. Cargo Compartment
1. Loadmaster control panels
2. Restraint rails
a. Securing left and right side restraint rails to floor
b. Checking each left and right side lock for proper manual operation
c. Securing left and right side ramp rails
d. Checking retractable lips for operation and availability of proper lip pins
e. Checking restraint rail end bumpers for quantity, condition and installation

f. Stowage of removable restraint rails
g. Allowable restraint rail tiedown pattern
3. Roller conveyors
a. Symmetric installation of conveyors
b. Proper seating and locking
4. Oxygen systems
5. Lighting systems
a. Electrical receptacles
6. Equipment stowage
7. Cargo compartment vents
a. Purpose of vents
b. Installation of plugs
8. Troop seat installation
a. Sidewall troop seats
b. Centerline troop seats
c. Aft facing seats
9. Litter installation
a. Centerline and sidewall stanchions
b. Litter clamps
c. Straps
d. Restraint cables
10. Comfort pallet
11. Crew galley

D. Auxiliary Power Units (APU)
1. Controls and operation
2. Fire and emergency controls

E. Cargo Winch
1. Installation and location
2. Controls and circuit breakers
3. Operation
4. Limitations and limiting devices
5. Snatch blocks and whiffletree snatch blocks
6. Winch cable wear strip

F. Ramp and Doors Systems
1. Loadmasters control panels
2. Normal operation of doors
3. ADS operation of doors
4. Emergency operation of doors
5. Installation of door latches and cam jacks
6. Auxiliary ramps
a. Installation for loading from ground and truck bed
b. Capabilities during ground loading and truck bed loading
c. Stowage
7. Connecting and stowing ADS links

G. Stabilizer Struts
1. Extending
2. Retracting
3. Stowing

H. Weight and Balance
1. Allowable floor loads
a. General cargo
b. Palletized cargo
c. Steel wheel
d. Solid rubber wheel
e. Pneumatic tired vehicles
2. Shoring computation
3. Formulas
a. Weight and balance
b. Vehicle C.G.
c. PSI/PSF/PLF
4. Interpolation of loading data charts

V. EMERGENCY EQUIPMENT AND PROCEDURES

A. Warning Systems
1. Interphone
2. Audible warning
3. Lights

B. Emergency Exits, Hatches and Chopping Areas
1. Location
2. Opening procedures
3. Lighting systems

C. Emergency Exit Lights
1. Location
2. Operation
3. Location of emergency exit switch

D. Life Rafts, Life Vests, Radio
1. Location
2. Deployment procedures

E. Escape Ropes and Ladders
1. Location
2. Deployment procedures

F. Emergency Escape Routes
1. Planned routes
2. Different conditions

G. Oxygen System
1. Crew oxygen system
2. Troop oxygen system
3. Therapeutic oxygen system
4. Oxygen distribution kits
5. Portable oxygen bottles

H. Fire Extinguishers
1. Location
2. Operation
3. Limitations

I. Crash Axes
1. Location

J. Fire Fighting Masks
1. Location
2. Operations
3. Limitations

K. First Aid Kits
1. Location
2. Contents

L. Personnel Restraining Harness
1. Location
2. Fitting of harness

M. Protective Clothing Kits
1. Location
2. Contents
3. Fitting of applicable items

N. Global Survival Kit

1. Location
2. Contents

O. Duties During Emergency Conditions
1. Ground operation emergencies
2. Fuselage fire
3. Electrical fire
4. Smoke & fume elimination
5. Inflight door warning
6. Rapid decompression
7. Ditching
8. Bailout
9. Cargo jettisoning
10. Landing emergencies

P. Troop Reaction on Sickness

Q. Engine Running Loading Procedures (IAW TO 1C-141A-1)

VI. GENERAL
A. Mission Knowledge
B. Professional Equipment
C. Initiative
D. Attitude
E. Aircrew Coordination
F. Safety Application
G. Special Cargo Knowledge
H. Traffic Knowledge
I. Supervisory Ability
J. Submission of Forms
1. MAC Form 119
2. Operational Hazard Reports
3. DD Form 6
4. MAC Form 1
5. SAAM Mission Reports

LOADMASTER FLIGHT TRAINING COURSE (PHASE II)

Reference text, paragraph 3-12. Also, relate to outline in attachment 2.

AERIAL DELIVERY SYSTEMS/PROCEDURES

A. Airdrop Mission Knowledge
1. Responsibilities
2. Radio discipline
3. Restrictions
4. Documentation
5. Load markings
6. Paratroop lighting
7. Checklist compliance
8. Authorized airdrop equipment
9. Wearing of parachutes
10. Briefings
11. Aircraft markings

B. ADS Cargo Kit Installation, Inspection and Operation
1. Restraint rails
2. Roller conveyors
3. Anchor cable forward support
   a. Beam-type
   b. Tripod-type
4. Anchor cable actuators
5. Anchor cables and retainer hooks
6. Static line retriever winches and control handles
7. Static lines and connections
8. Extraction parachute holder winch
9. Pendulum nose assembly
10. Extraction parachute release mechanism
11. Extraction parachute holder arming control
12. ADS arming switch
13. Extraction line restraint fitting
14. Ramp end cover and skid blocks
15. ADS links

C. Paratroop Kit Installation, Inspection and Operation
1. Sidewall seats
2. Centerline seats
3. Troop oxygen system
4. Anchor cables forward support
   a. Beam-type
   b. Tripod-type
5. Anchor cable intermediate supports
6. Anchor cable actuators
7. Anchor cables and retainer hooks
8. Static line retriever winch and cargo winch
9. Static lines and yoke assemblies
10. Air deflector doors; paratroop/air deflector door bypass system
11. Jump platforms and lights
12. Paratroop retriever bar
13. Paratroop jump signals
14. Personnel warning signs
15. Portable urinal

D. Inspection of Airdrop Loads (Before Loading)
1. Critical load factors
   a. Applicable AF Technical Order number, title and date
   b. Type and dimension of platform
   c. Roller loads
   d. Weight and C.G. of completely rigged load
   e. Allowable speed for airdrop of load
   f. Longitudinal height profile and lateral cross-sectioned area of the load
   g. Extraction parachute type, diameter and reefed condition
   h. Extraction line length
   i. Load to platform restraint factors
   j. Maximum height and width of load
2. Side rails of platform
3. Bowing of rigged platform
4. Dangerous cargo
5. Completion of airdrop inspection form

E. Airdrop Loading Operations
1. Aircraft preparation and configuration
2. Proper positioning of doors and ramps
3. Proper use of loading aids
4. Alignment of load with aircraft
5. Position of restraint rail detents for loading
6. Briefing of loading crew
7. Hand signals and safety measures
8. Supervision of loading operations
9. Load placement

F. Restraint
1. Restraint computation
2. Operation of restraint rails
3. Setting of aft restraint
4. Installation of emergency aft restraint
   a. Extraction from the load
   b. Extraction from the platform

G. Extraction System Installation
1. Installation of extraction parachute
   a. Safety loop around V-ring
   b. Proper pendulum line length
   c. Operation of extraction parachute holder

d. Securing pendulum line
e. Taping shear knives
f. Extraction line tie to restraint fitting
g. Lock and cover type IV connector link
h. Accordion fold or extraction line
2. Rigging for single platforms
3. Rigging for multiple platforms (static only)
4. Rigging of static lines
5. Rigging clustered extraction parachutes
a. Single loads
b. Multiple loads (static only)

H. Inspection of Airdrop Loads (After loading)
1. Completion of Airdrop Inspection Form
2. Disposition of Airdrop Inspection Form

I. Paratroop Briefing and Control
1. Movement in aircraft
2. Emergency procedures for towed parachutists

J. Aircraft Commander and LM Briefing
1. Review of emergency procedures
2. Documentation

K. Time Warnings and Procedures
1. Compliance with checklist
2. Opening of troop doors
3. Opening of pressure door
4. Installation of ramp end cover
5. Release of extraction parachute
a. Electrical
b. Manual
6. Dropping of training bundle
a. Personnel simulation
b. Heavy equipment simulation

L. Airdrop Equipment Malfunction
1. Extraction parachute(s) fail to release electrically and manually
2. Extraction parachute(s) falls on ramp
3. Extraction parachute(s) fails to extract load (single platform)
4. Extraction parachute(s) fails to extract load (multiple platforms)

M. Paratroop Emergencies
1. Red light before drop
2. Towed paratroop

N. Static Line Retrieval
1. Cargo and bundle static lines
2. Paratroop static lines
3. Retrieval with cargo winch

O. Knowledge of Directives
1. TO 1C-141A-9
2. TO 1C-141A-1
3. TO 13C7-1-5
4. Applicable 13C TO for airdrop load
5. MACM 55-141
6. MACM 55-4

P. Cargo/Extraction Parachute Knowledge
1. Type, diameter, reefed conditions and weight capability
2. Inspection Items
a. Proper rigging for single and multiple load extractions
b. Proper extraction line
c. Proper clustering and installation
d. Entries in Parachute Log Record Book
e. Proper bag closing ties
f. Proper pendulum line
3. Parachute extraction systems operating limits

PILOT UPGRADE FLYING TRAINING COURSE

Reference text, paragraph 3-4a(3).

1. This course is planned for eight hours of pilot time at the controls of the aircraft. The pilot hours logged during the flight evaluation may be used to complete eight-hour total. Four of the eight hours may be accomplished in the simulator; however, *the asterisked items must be accomplished in the aircraft.* The annual simulator refresher course will satisfy the four hours of simulator time. Normally, training for first pilot and aircraft commander upgrade candidates will be scheduled with the annual simulator course being given prior to local flying. Candidates not in phase for the annual simulator course will be scheduled for simulator training prior to flying local if additional simulator time is available.

2. Instructional time planned does not preclude additional simulator or local flying training if required. Unless otherwise indicated, all flying will be done from the left seat. Further, the scheduled course can be shortened if proficiency is demonstrated on all requirements. All events listed in the syllabus are mandatory and will be accomplished by candidates prior to being designated as first pilots or aircraft commanders.

3. Instrument flight will be taught using the control and performance techniques described in AFM 51-37. The importance of flying smoothly for passenger or air evac patient comfort will be stressed during all phases of flight.

4. All ILS approaches will be conducted using full AWLS capability to a Category II DH or DH based on a HAT of 100 feet. The instructor will emphasize the following subjects during category II ILS approaches:

a. Resolution of the decision height.

b. Missed approach technique using fixed or computed attitude guidance display, as appropriate.

c. Runway visual range, its use and limitations.

d. Transition from nonvisual to visual flight.

e. The effect of vertical and horizontal wind shear.

5. The course syllabus begins at the top of the next page following this paragraph. The pilot may perform line missions between training mission number one and completion of the syllabus. Units should make every effort to schedule candidates for missions II, III, and IV without interruption.

NOTE TO INSTRUCTOR: The instructor briefing and mission outlines (following page) are designed to be used in checklist form by the instructor and may be reproduced as necessary for local use. The briefing and mission outlines show mandatory training events listed in a suggested sequence which may be varied as traffic and weather conditions dictate. They do not replace the MAC Forms 21 and 21a that must be filled out for each flight. Ground briefings prior to flight should emphasize emergencies to be given during the mission. While all items on the briefing outline cannot be discussed prior to any one flight, care should be taken to insure all items are covered at least one prior to syllabus completion. The upgrade training standards are indicated by figure 3-1, *Standards to be Applied when Evaluating Applicable Maneuvers,* MACM 60-1, volume I. A student will not be recommended for an upgrade evaluation until these standards have been met.

PHASE II PILOT UPGRADE SYLLABUS	
I. INSTRUCTOR BRIEFING OUTLINE. ALL MISSIONS. Brief or quiz the student on the following prior to flight:	Compl
A. BOLD FACE EMERGENCY ACTIONS	
B. GROUND OPERATIONS	
1. APU fire	
2. Start malf (fire, hung start, etc.)	
C. TAKE OFF EMERGENCY ACTIONS	
1. Abort procedures - brake limitations	
2. Inadvertent spoiler deployment	
3. Runaway trim	
4. Inadvertent thrust reverser deployment	
5. Eng failure - take off continued	
D. INFLIGHT EMERGENCIES	
1. Eng failure above FL 350 - drift down	
2. Airstart procedures	
3. Bailout and cargo jettison procedures	
4. Fuel jettison procedures	
5. Door open warn, rapid decomp and emerg descent	
6. Engine ovht and fire	
7. Windshield crack or impairment	
8. Engine vibration	
9. Flight control failure and tab operable	
10. Dutch roll	
E. LANDING EMERGENCIES	
1. Gear failure and partial gear landing	
2. Ditching	

	Compl
3. Landing and go-around with eng(s) fail	
4. Brake failure	
5. No flap landing	
6. Landing with trim malfunctions	
F. SYSTEMS AND LIMITATIONS	
1. Electrical system(s) failure	
2. Hydraulic system(s) failure	
3. Pneumatic system(s) failure	
4. Anti-ice system(s) failure	
5. Fuel system	
6. Spoiler system	
7. CADC failure	
8. AWLS system	
9. Artificial feel system	
G. MANUALS AND REGULATIONS	
1. AFM 60-16 and MACSUPS	
2. AFM 60-1 and MACSUPS	
3. AFR 60-11	
4. Foreign Clearance Guide	
5. ICAO Flip publications	
6. MACM 55-1	
7. MACM 55-3, Vol I	
8. MACM 60-1, Vol I	
9. MACR 51-1	
10. Local wing and MACAF supplements	
11. MACR 57-5	
II. PREPARATION FOR FLIGHT - ALL MISSIONS	
A. PRIOR TO REPORTING TO AIRCRAFT	
1. Predepart crew briefing (may be done at acft)	
2. FCIF and FCB	
3. TOLD card computation	
4. DD Form 175	
5. NOTAMS and weather	

6. ACP	
7. Special TOLD card computation	
Mission II	
NOTE: For this mission only a TOLD card will be accomplished using the TO 1C-141A-1-1. Operating weight 135,000 lbs, fuel 110,000 lbs, cargo 55,000 lbs floor loaded explosives, temperature + 10 degrees C, pressure altitude + 200', wind 230 degrees 10K with gusts to 20K, runway 21R, dry runway, Travis weather 300' 3/4 mile visibility. This data will be completed prior to show time. Actual mission performance data will be computed from tabulated data.	
B. AT AIRCRAFT	Compl
1. DD Form 781 and 365F	
2. Locate and check O_2 system and emer equip (MAC Form 222a)	
3. Operate ramp, pressure, petal doors, Operate emer lights, troop doors, exit doors. (Msn No. 2 only)	
4. Arrange flt deck, charts, SIDS, Perf data	
5. Tune and check navaids and radios check O_2 mask	
6. Ramp gate procedures	

III. MISSION OUTLINES

A. MISSION I - This mission is for first pilot candidates only and will be accomplished in the acft. This mission is not required for TTU graduates after class No. 157.

NOTE: Students should be allowed to execute normal VFR landings to the satisfaction of the instructor prior to initiation of emergencies. Emphasis should be on normal aircraft control throughout the mission with emergencies introduced based on the student's proficiency as determined by the instructor. All landings will simulate clearing a 50' obstacle.

	Compl
1. ENGINE START AND TAXI	
a. Normal start - EGT and starter limit	
b. Taxi and braking technique	
c. Instrument panel crosscheck	
d. Aircraft clearance while taxiing	
e. Copy and understand ATC clearance	
f. Departure navaid setup	
g. Crew briefing	
2. TAKE OFF AND CLIMB	
a. Standing take off	
b. Closed VFR pattern using VASI if available	
c. Engine failure on climbout (optional)	
d. Execution of holding instructions at high or low altitude	
3. APPROACHES (5)	
a. VFR using VASI (one or more as required).	

	Compl
b. Penetration (optional) TACAN or VOR	
c. TACAN or VOR (1)	
d. Vectors to ILS final (1) (Auto-auto mode desired)	
e. ILS (1) (Auto-Man or Man-Man Mode)	
f. PAR or ASR (1)	
g. Missed approach (1)	
4. LANDINGS	
a. Touch and go as required	
b. Three engine full stop (optional)	
c. Full stop (1)	
5. AFTER LANDING	
a. Emergency brake operation	
b. Taxi clearances	
c. Marshalling signals	
d. Completion of DD Form 781	
6. CRITIQUE	
7. OPTIONAL LOCAL USE SPACE (comments, notes by FEAC to transfer to MAC Form 21 after flight)	

B. MISSION II	Compl
1. ENGINE START AND TAXI	
a. Hot, hung, or false start	
b. EGT and starter limitations	
c. Clearing engine procedure	
*d. Taxi and breaking technique	
e. Instrument and panel crosscheck	
*f. Aircraft clearance while taxiing	
g. Simulated APU fire and evacuation	
h. Copy and understand ATC clearance	
*i. Monitor copilot and checklist actions while taxiing	
j. Departure nav-aid set up	
k. Crew briefing	
2. TAKE OFF Standing	
3. CLIMBOUT Execution of SID to hold patt fix	
4. AIRWORK	
a. High alt hold at pub fix (1)	
b. Simulated engine shutdown (1)	
5. APPROACHES (7)	
a. Penetration TACAN, ADF or VOR (1)	
b. VOR (1)	
c. PAR (1)	
d. ILS (3) (one per AWLS mode)	
e. Vectors to ILS or PAR final (1)	
f. Gyro out GCA (1)	
g. Go around and missed appr procedures (1)	
*h. Three-engine go around (1)	
i. Circling approach (1)	
j. BDHI only (VOR, ADF or TACAN) (1)	

	Compl
6. LANDINGS	
*a. Touch and go (as required)	
*b. Partial (20-30%) Flap (1)	
*c. Simulated three engine (1)	
7. AFTER LANDING	
a. Emergency brake operation	
*b. Taxi clearances	
*c. Marshalling signals	
*d. Completion of DD Form 781	
8. CRITIQUE	
9. OPTIONAL LOCAL USE SPACE (for IAC remarks, notes and items not covered.) Transfer to MAC Form 21 after flight.	

C. MISSION III	Compl
1. ENGINE START AND TAXI	
a. Taxi and braking technique	
b. Instrument and panel crosscheck	
c. Aircraft clearance while taxiing	
d. Copy and understand ATC clearance	
e. Monitor copilot and checklist actions while taxiing	
f. Departure nav-aid set up	
g. Crew briefing	
2. TAKE OFF Rolling	
3. CLIMBOUT Execution of SID to hold pattern or fix	
4. AIRWORK	
a. High alt hold at published fix (1)	
*b. Actual engine shutdown (at altitude) (1)	
*c. Simulated second engine shutdown (at altitude) (1)	
*d. Simulated two engine approach & go around (1)	
*e. Actual engine airstart (1)	
*f. Tab operable (if not done at TTU) (1)	
5. APPROACHES	
a. Penetration TACAN ADF or VOR (1)	
b. TACAN (1)	
c. ADF (1)	
d. ASR (1)	
e. Gyro out GCA (1)	
f. Circling approach (1)	
g. BDHI only (VOR, ADF or TACAN) (1)	

	Compl
*h. VFR using VASI if avail (time permitting)	
6. LANDINGS	
*a. Touch and go (as required)	
*b. No flap full stop (AC candidates only) (1)	
7. AFTER LANDING	
a. Emergency brake operation	
*b. Taxi clearances	
*c. Marshalling signals	
*d. Completion of DD Form 781	
8. CRITIQUE	
9. OPTIONAL LOCAL USE SPACE (for IAC remarks, notes and items not covered.) Transfer to MAC Form 21 after flight.	

D. MISSION IV	Compl
1. ENGINE START AND TAXI	
a. Hot, hung, or false start	
b. EGT and starter limitations	
c. Clearing engine procedure	
*d. Taxi and braking technique	
e. Instrument and panel crosscheck	
*f. Aircraft clearance while taxiing	
g. Copy and understand ATC clearance	
*h. Monitor copilot and checklist actions while taxiing	
i. Departure nav-aid set up	
j. Crew briefing	
2. TAKE OFF	
Standing	
3. CLIMBOUT	
a. Simulated engine failure or other malfunction on depart	
b. Execution of SID to hold pattern or fix	
*c. Emergency return and go around (3 engine)	
4. AIRWORK	
a. Low alt depart hold on airways fix (1)	
b. Simulated engine shut down (1)	
5. APPROACHES	
a. VOR (1)	
b. TACAN (1)	
c. ADF (1)	
d. PAR (1)	
e. ILS (2) (Any mode)	
f. Vectors to ILS or PAR final (1)	
*g. Three-engine go around (1)	

	Compl
6. LANDINGS	
*a. Touch and go (as required)	
*b. Simulated three engine (1)	
*c. No flap full stop (AC candidate only) (1)	
*d. Right seat landing (AC candidate only (1)	
e. Rejected takeoff and brake limit (Include after final ldg.) (1)	
7. AFTER LANDING	
a. Emergency brake operation	
*b. Taxi clearances	
*c. Marshalling signals	
*d. Completion of DD Form 781	
8. CRITIQUE	
9. OPTIONAL LOCAL USE SPACE (for IAC remarks, notes and items not covered.) Transfer to MAC Form 21 after flight.	

PILOT/FLIGHT ENGINEER SIMULATOR REFRESHER COURSE OUTLINE

Reference text, paragraph 4-2a.

The annual C-141 simulator refresher course is designed to improve MAC standardization and to provide maximum training on normal, instrument, and emergency procedures. The course is scheduled to be completed in a minimum of 16 hours and will include a standardization evaluation for aircraft commanders and first flight engineers. Normally, the course will consist of four consecutive four-hour missions. Crew members will exchange seats at the end of two hours of each four-hour mission with briefing and debriefing as required beyond the four hours. Missions may be altered to permit flexibility in training; however, all items outlined must be completed during the training course.

I. MISSION PRE-BRIEFING (1-1/2 - 2 HOURS).

A. Aircraft Systems Review. The following areas will be reviewed during the pre-briefing portion of the refresher course.

1. Warning systems.
2. Oxygen systems
3. Smoke, overheat, and fire detection and extinguishing systems
4. Fuel system
5. Environmental, anti and de-icing systems
   a. High pressure bleed system
   b. Air conditioning system
   c. Pressurization system
   d. Wing anti-ice system
   e. Rain removal system
   f. Empennage de-ice system
6. Electrical system
   a. AC power sources and buses
   b. AC power distribution system
   c. DC power distribution system
   d. Main generator system
   e. Ground and emergency power
7. Engines
   a. Engine oil system
   b. Thrust reverser system
   c. Engine starting and ignition system
8. Instruments
   a. Pitot static system
   b. Total temperature system
   c. Central Air Data Computer system (CADC)
   d. C-12 compass system
9. Hydraulics
   a. Hydraulic systems
   b. Primary flight controls
   c. Secondary flight controls
   d. Landing gear
   e. Brake systems
   f. Cargo doors
10. Communication/Navigation systems
11. Integrated Flight Control system
   a. Yaw damper
   b. Auto-pilot
   c. Flight director system
   d. All Weather Landing System (AWLS)
12. Procedures for Combat area
   a. Backing the aircraft
   b. Zero flap takeoff
   c. 3-engine ferry procedures
   d. Engine running loading procedures
13. Electronic warfare (IAW MACR 50-12)
   a. Communication Interference and countermeasures
   b. NAV/AIDS interference and countermeasures
      (1) Radio nav/aids
      (2) Radar
      (3) Doppler
   c. Reporting procedures
14. Emergency Procedures not Covered in Simulator
   a. Crash landing
   b. Bailout
   c. Ditching
   d. Two and three engine driftdown
15. Performance
16. Mission briefing

II. SIMULATOR MISSIONS

A. Pilot Judgment and Quick Decision Problems

1. Minimum of one quick decision problem for each simulator period.
2. Minimum of one planned mission where conditions can be altered or emergencies created that will test the crew's ability to think and plan during periods of stress.
3. Minimum of one planned mission where minimum altitude for terrain/obstacle clearance during climb, cruise, and descent is stressed.

B. Instrument Approaches and Procedures. Emphasis should be placed on non-precision and CAT II approaches.

1. Instrument departure (SID)
2. Jet penetration
3. VOR approach
4. TACAN approach
5. ADF approach
6. CAT II ILS approach (AWLS)
7. Back course ILS approach
8. Missed approach

9. High and low altitude holding
10. Lost communications procedures
11. Jamming

C. Emergencies and Malfunctions. As a minimum, the following will be given at least once during the length of the course. Those items not actually covered in the simulator will be discussed during the briefing/debriefing.

1. APU fire
2. Starting malfunctions
   a. Hot start
   b. Hung start
3. Engine fire on ground
4. Wing isolation valve failure
5. Yaw damper failure/fault
6. Aborted takeoff
7. Engine fire/failure takeoff con't
8. Runaway pitch trim
9. Engine overheat
10. Precautionary engine shutdown
11. Engine failure/fire in flight
12. Air start
13. Fuel jettison
14. Cargo jettison
15. Fuselage fire
16. Smoke and fumes elimination
17. Electrical malfunctions
    a. Electrical fire
    b. DC power failure
    c. Loss of all generators
    d. Constant speed drive (CSD) failure
18. Turbulence and thunderstorms
19. Stall prevention system failure
20. CADC failure
21. Engine, wing, and empennage icing
22. Wing, pylon and air-conditioning compartment overheat
23. Compass failure
24. Oil system failure
    a. Low quantity
    b. Low pressure
    c. High temp
25. NR 1, 2, and 3 hydraulic system failure
26. Landing gear failure
27. Flight control failure; aileron hinge plate failure
28. Flap asymmetry
29. Thrust reverser failure/inflight extension
30. Spoiler failure/asymmetry
31. Elevator feel malfunction
32. In-flight door warning
33. Rapid decompression
34. Emergency descent
35. Three engine approach, and go-around
36. Two engine approach and go-around
37. No-flap approach
38. Wheels up landing
39. Anti-skid failure

III. POST FLIGHT DE-BRIEFING.

A. De-Briefing and Critique

B. Grade and Record All Flights

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