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Flying Operations

C-21A OPERATIONS PROCEDURES

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This Air Force Manual (AFMAN) implements Air Force Policy Directive (AFPD) 11-2, *Aircrew Operations*. This is a specialized publication intended for use by Airmen who have graduated from technical training related to operation of this aircraft. It establishes guidance and procedures for operation of the C-21 aircraft to safely and successfully accomplish worldwide mobility missions. This manual applies to military and civilian members of the Regular Air Force, Air Force Reserve, and Air National Guard involved with employing C-21 aircraft. This publication does not apply to the United States Space Force. Ensure all records generated as a result of processes prescribed in this publication adhere to AFI 33-322, *Records Management and Information Governance Program*, and are disposed in accordance with the Air Force Records Disposition Schedule, which is located in the Air Force Records Information Management System. Refer recommended changes and questions about this publication to the office of primary responsibility (OPR) using the DAF Form 847, *Recommendation for Change of Publication*; route DAF Forms 847 from the field through the appropriate functional chain of command. The authorities to waive wing or unit level requirements in this publication are identified with a tier ("T-0, T-1, T-2, T-3") number following the compliance statement. See Department of the Air Force Manual (DAFMAN) 90-161, *Publishing Processes and Procedures*, for a description of the authorities associated with the tier numbers. Submit requests for waivers through the chain of command to the appropriate tier waiver approval authority or alternately to the requestor's commander for non-tiered compliance items. See **paragraph 1.4** for additional waiver procedures. Operations Group Commanders (OG/CCs) should define local operating procedures in a unit supplement to this manual. OG/CCs must obtain approval from MAJCOM prior to releasing their supplement. Send an electronic copy of the approved version to Air Mobility Command (AMC) Stan/Eval. The use of the name or mark of

any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

SUMMARY OF CHANGES

This document has been revised and should be completely reviewed. Major changes include Command and Control; elimination of redundant or conflicting guidance; addition of seating chart; addition of alerting procedures; clarification of arresting cable guidance; enhanced fuel planning information.

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Chapter 1

GENERAL INFORMATION

1.1. General. This AFMAN provides guidance and procedures for operating the C-21 aircraft. It is an original source document for many areas, but for efficacy, it may restate information found in aircraft flight manuals, Flight Information Program (FLIP) publications, and other Air Force directives. When guidance in this publication conflicts with another source document, that document takes precedence. For matters where this publication is the source document, waiver authority is IAW **paragraph 1.4**. For matters where this publication repeats information in another document, follow waiver authority outlined in the source document.

1.2. Key Words Explained.

1.2.1. "Will" and “Must” indicate a mandatory requirement.

1.2.2. "Should" indicates a preferred, but not mandatory, method of accomplishment.

1.2.3. "May" indicates an acceptable or suggested means of accomplishment.

1.3. Roles and Responsibilities.

1.3.1. Major Command. MAJCOMs provide guidance and approve waivers (as required), where specified throughout this manual.

1.3.2. Pilot in Command (PIC). The PIC is the aircrew member designated by competent authority, regardless of rank, as being responsible for, and is the final authority for, the operation of the aircraft. The PIC will ensure the aircraft is not operated in a careless, reckless, or irresponsible manner that could endanger life or property. The PIC will ensure compliance with this manual and the following:

1.3.2.1. Headquarters Air Force (HAF), MAJCOM, and mission design series-specific guidance.

1.3.2.2. FLIP and DoD *Foreign Clearance Guides* (FCG).

1.3.2.3. Air Traffic Control (ATC) clearances.

1.3.2.4. Notices to Airmen (NOTAMs).

1.3.2.5. Aircraft Technical Orders (T.O.).

1.3.2.6. Combatant commander's instructions and other associated directives.

1.3.3. Aircrew Members. Individuals designated on the flight authorization are responsible to fulfill specific aeronautical tasks regarding operation of USAF aircraft as specified in this AFMAN or by other competent, supplemental authority.

1.4. Deviations and Waivers. Reference DAFMAN 90-161, *Publishing Processes and Procedures,* for waiver processes and limitations. Do not deviate from the guidance and procedures in this publication except when the situation demands immediate action to ensure safety. The PIC is trusted with ultimate mission authority and is responsible for each course of action taken.

1.4.1. Deviations. The PIC must report deviations or exceptions taken without a waiver within 48-hours of deviation through command channels to their Chief of MAJCOM Stan/Eval who

in turn notifies the Chief of AMC Standardization and Evaluation (AMC/A3V) (lead command) as appropriate.

1.4.2. Waiver Authorities. The waiver authorities in this publication are identified with a tier (T-0, T-1, T-2, T-3) number following the compliance statement. See DAFMAN 90-161 for a description of the authorities associated with the tier numbers. Submit requests for waivers through the chain of command to the appropriate tier waiver approval authority, or to the requestor's commander for non-tiered compliance items.

1.4.2.1. Due to the unique nature of Operational Support Airlift (OSA) missions, T-3 waivers may be delegated from the unit's Wing Commander to the Operations Group Commander or Squadron Commander.

1.4.2.2. If a waiver is approved, the waiver authority will inform the next higher level in the chain of command and this publication's OPR within 30 days of approval.

1.4.3. For the purposes of this manual, MAJCOMs are Air Mobility Command (AMC) and United States Air Forces Europe (USAFE). Commanders, Air Force forces in the grade of O-8 or higher in combatant commands are considered MAJCOM commanders only for forces under their operational control.

1.4.4. Waiver Periods. Reference DAFMAN 90-161. Commanders will ensure that long-term waivers, with specific expiration dates, affecting multiple aircraft or missions, are approved by the applicable MAJCOM A3 and sent from the appropriate MAJCOM Stan/Eval to AMC/A3V. **(T-2)**

1.5. Supplemental Procedures. Each user MAJCOM or operational theater may supplement this publication according to AFPD 11-2, *Aircrew Operations*, and DAFMAN 90-161. Stipulate unique MAJCOM procedures and publish MAJCOM A3-approved permanent waivers in the MAJCOM supplement. Forward MAJCOM approved supplements (attach DAF Form 673, *Department of the Air Force Publication/Form Action Request*) to AMC/A3V for mandatory coordination prior to approval.

Chapter 2

COMMAND AND CONTROL

2.1. General. Command and Control (C2) encompasses the concepts and functions of execution authority, operational reporting/in-transit visibility, mission scheduling, and mission support. Aircrews should understand that individual C2 centers do not perform all these functions.

2.1.1. Operational Support Airlift (OSA) Command Relationships.

2.1.1.1. The Secretary of the Air Force maintains command authority, and the Chief of Staff of the Air Force maintains supervisory authority over service retained CONUS-based OSA assets through Headquarters AMC to the respective flying unit wing commander.

2.1.1.2. OSA assets routinely operate outside the normal C2 structure of AMC. Due to mission sensitivity, distinguished visitor (DV) missions in execution remain under the C2 of the unit supporting the mission.

2.1.2. Air Mobility Command. AMC is designated the lead command for USAF OSA assets and develops appropriate policy to support the units and aircraft. AMC Threat Working Group guidelines will typically be adhered to by the USAF service retained OSA fleet. AMC/A3/10 maintains waiver authority. Missions may be supported with integrated flight management (IFM) from 618 AOC (TACC) or AMC-approved commercial dispatch services (e.g., ARINC).

2.1.3. U.S. Air Forces in Europe (USAFE). C2 support is IAW command/local supplements.

2.1.4. When re-route or divert is directed by a C2 agent that does not provide planning support (e.g., local Command Post), the aircrew should be afforded time necessary to review planning documents, replan the mission, and ensure safe execution. With aircrew input, C2 agents should revise the mission itinerary as required, and notify customers of the changes when necessary.

2.2. Execution Authority. Wing Current Operations serves as the single point of contact for mission assignments from outside agencies, and acts as liaison between the PIC, unit C2 staff, and those agencies during the mission planning phase. Once a mission is in execution, mission execution authority for C-21 missions vary depending on the location and type of mission flown, as defined below.

2.2.1. HAF/A3M and Joint Operational Support Airlift Center (JOSAC)-Tasked Missions. Execution authority is held by HAF/A3M or JOSAC, as applicable. Unit Command Post acts as liaison between aircrews and the execution authority.

2.2.2. USAFE Operational Missions. Tasking approval and execution authority is IAW command/local supplements.

2.2.3. Local Training Missions. Execution authority is held by the unit’s OG/CC.

Chapter 3

AIRCREW COMPLEMENT/MANAGEMENT

3.1. General. This chapter provides guidance to form and manage mobility aircrews. Commanders at all levels will follow this guidance to form aircrews and to develop aircrew-related work/rest schedules that optimize efficiency of mobility forces engaged in worldwide operations.

3.2. Aircrew Complement. Squadron commanders should form aircrews based on fragmentation order/mission directive, crew duty time (CDT), and flight duty period (FDP) requirements, aircrew member qualifications, and other constraints to safely accomplish the mission tasking.

3.2.1. The basic crew complement for the C-21 is one aircraft commander (AC) and a pilot.

3.2.2. The C-21 does not have an augmented crew complement.

3.2.3. The minimum aircrew member complement for a local training flight is an AC and a pilot.

Table 3.1. C-21 Seating Chart.

	Right Seat[4,5]								
		EP	IP	MP	FPK/L	FPQ	FPC	FPN	UP
Left Seat[4,5]	EP	Y	Y	Y	Y	Y	Y	Y	Y
	IP	Y	Y	Y	Y	Y	Y	Y	Y
	MP	Y	Y	Y	Y	Y	Y	CO[1]	CO[1]
	FPK/L	Y	Y	Y	CO[2,3]	CO[2,3]	CO[1,2]	N	N
	FPQ	Y	Y	Y	CO[2,3]	CO[2,3]	CO[1,2]	N	N
	FPC	Y	Y	N	CO[1,2]	CO[1,2]	N	N	N
	FPN	Y	Y	N	N	N	N	N	N
	UP	Y	Y	N	N	N	N	N	N

Y – Yes, N – No, CO – Cruise Only

Notes:

1. Assumes instructor pilot (IP) supervision (not "direct" IP supervision). Direct supervision is required while performing non-current event for non-current aircrew members and during critical phases of flight.
2. Y – Operational Mission Evaluation (OME) only with EP supervision.
3. Requires AC supervision only.
4. A basic qualified (valid C-21 AF Form 8, *Certificate of Aircrew Qualification*) senior officer who has completed a Senior Officer Qualification (SOQ) course may occupy either pilot seat with passengers onboard, if under direct IP supervision.
5. In-air seat swaps can help maximize training, consolidate effort, and enhance crew complement. When swapping out, the pilot remaining in the seat guards all levers and switches.

3.3. Aircrew Member Qualification. Aircrew members will be qualified, or in qualification training, to perform duties as a primary aircrew member. **(T-2)**

3.3.1. Senior leaders who complete a Senior Staff Qualification course (restricted AF Form 8) or orientation for a Senior Staff Familiarization flight may occupy a primary crew position when under direct IP supervision. Refer to DAFMAN 11-401, *Aviation Management*, for procedures and requirements governing senior leader flying.

3.3.2. Aircrew members who complete the Senior Staff Course will log First Pilot, "FP", as the Flight Authorization Duty Code on the AFTO Form 781, *ARMS Aircrew/Mission Flight Data Document*.

3.3.3. Aircrew members who complete the Senior Officer Familiarization flight will log "OP" as the Flight Authorization Duty Code on the AFTO Form 781.

3.4. Pilots. An IP must provide direct supervision to non-current, non-mission ready, or unqualified pilots regaining currency or qualification. **(T-2)**

3.4.1. Missions with Passengers. To occupy a pilot's seat with passengers, pilots must have a current C-21 AF Form 8. **(T-2)** For takeoff, approach, and landing one of the following conditions must be met: **(T-2)**

3.4.1.1. A qualified pilot non-current no more than 60 days for flying currency requirements and an IP providing direct supervision. ACs regaining currency may be designated PIC.

3.4.1.2. A qualified, non-mission ready pilot accomplishing Mission Certification Training (MCT) and an IP providing direct supervision. SQ/CCs may authorize aircrew members who have completed all Mission Qualification Training (MQT) flying training events prior to completing all mission ready-required ground training events to fly unsupervised on local training and routine unit missions, provided the remaining ground training items do not affect mission accomplishment.

3.4.1.3. A qualified AC upgrade candidate on an initial or requalification OME and a qualified pilot (FP or higher) may occupy either pilot seat with passengers onboard, if under supervision of a qualified evaluator pilot (EP) during all phases of flight. AC upgrade candidates will be designated as "acting in the next higher crew qual" for evaluation purposes.

3.4.2. Qualification Training. PICs will not conduct pilot initial qualification, requalification, or upgrade training on missions with passengers onboard. **(T-2) Exception:** MCT, OMEs, and AC upgrade training (line training missions) may be conducted on missions with passengers onboard, only if the individual in training is qualified to the applicable level.

3.5. Alerting Procedures.

3.5.1. Legal For Alert Time. Prior to entering crew rest, PICs will establish legal for alert time with C2 IAW AFMAN 11-202V3_AMCSUP. Normal aircrew alert time is 3+00 before scheduled takeoff time (1+00 hour for reporting and 2+00 hours for mission preparation). PICs may adjust this timeline as required for mission accomplishment. Any changes to normal aircrew alert time will be coordinated with C2.

3.5.2. Self-Alerts. Units provide guidance for self-alerting procedures. When self-alerts are approved, PICs will coordinate with C2 prior to entering crew rest. **(T-3)** The PIC sets show time and location. Show time will be no earlier than 12 hours after entering crew rest. **(T-3)**

Begin FDP/CDT at the earlier of scheduled show time, or when the first aircrew member reports for official duties.

3.6. Off-Station/Enroute Ground Time.

3.6.1. Mobility planners and C2 agents will provide aircrews at least 16 hours of ground time between engine shutdown and subsequent takeoff. **(T-3)**

3.6.2. Enroute stops should be scheduled for 1+15 ground time. At fields with known delays (fueling, long taxi, congestion, etc.) planners may request extended ground times. Contact the destination fuel service provider via the AIR Card website, and review FLIP and Global Decision Support System (GDSS) Airfield Detail (Giant Report) to identify fields where fueling delays can be expected.

Chapter 4

AIRCRAFT OPERATING RESTRICTIONS

4.1. Objective. Redundant systems may allow crews to safely perform some missions when a component or system is degraded. The PIC is the final authority in determining the overall suitability of an aircraft for the mission. The PIC will ensure detailed explanations of discrepancies are entered in the AFTO Form 781A, *Maintenance Discrepancy and Work Document*.

4.2. Minimum Equipment List (MEL) Guidance and Procedures.

4.2.1. T.O. 1C-21A-1, Section V, *Operating Limitations,* provides the C-21 MEL. The PIC is responsible to account for the possibility of additional failures during continued operation with inoperative systems or components. The MEL is not intended for continued operation with inoperative systems or components over an indefinite period.

4.2.2. Install all emergency equipment unless specifically exempted by mission requirements/directives.

4.2.3. PICs operating with waiver(s) for degraded equipment coordinate mission requirements (i.e., revised departure times, fuel requirements, maintenance requirements, etc.) with the controlling C2 agency and/or flight manager.

4.2.4. If beyond C2 communication capability, or when it is necessary to protect the aircrew or aircraft from a situation not covered by this chapter and immediate action is required, the PIC may deviate according to **paragraph 1.4**.

4.3. Minimum Equipment List (MEL) Waiver Protocol. Waivers to operate with degraded equipment are granted on a case-by-case basis. The PIC determines the need for a waiver after coordinating with the lowest practical level of command. When prepared to operate with a degraded MEL item, the PIC submits waiver requests through C2 channels. The PIC will provide the C2 agent: 1) nature of request, 2) individual aircrew member qualification, 3) mission leg(s) requiring the waiver, 4) weather or other adverse condition, and 5) the governing directive of waiver request to include volume, chapter, or paragraph. Initiate waiver requests as soon as possible; plan for at least 1-hour waiver processing time. Waiver authority is as follows for:

4.3.1. Training Missions: OG/CC (or equivalent) with mission execution authority.

4.3.2. Operational Missions: OG/CC (or equivalent) of the tasked unit. Initiate the request with the C2 agency supporting the mission.

4.3.3. Contingency Missions: Director of Mobility Forces (DIRMOBFOR) (or equivalent) for the agency with C2, if not specified in the operational order (OPORD)/tasking order.

4.4. Technical Assistance. The PIC may request (at any time in the decision process) technical support from maintenance representatives, home unit Stan/Eval, and MAJCOM/A3 staff.

4.5. Minimum Equipment List (MEL) Table Definitions/Column Identifiers. The MEL tables in T.O. 1C-21A-1 are arranged by aircraft system as a mechanism for the PIC to determine minimum system requirements. Aircrews will consider bases supported by C-21 contractor logistics support (CLS) maintenance as main operating bases (MOBs). When transiting a MOB on an enroute stop, use column A.

4.5.1. Remarks/Limitations/Exceptions. Some technical information and procedures are contained in this column of the MEL table. This is not all-inclusive; aircrew members will refer to the flight manual and other directives for procedures, techniques, limitations, etc.

4.5.1.1. One-Time Flight: Ensure any associated Red X discrepancies have been downgraded IAW T.O. 00-20-1AMCSUP, *Aerospace Equipment Maintenance Inspection, Documentation, Policies, and Procedures,* and AFI 21-101AMCSUP, *Aircraft and Equipment Maintenance Management,* Table 11.1 Item 3, prior to flight. An MEL waiver and/or MAJCOM Stan/Eval approval may still be required. This condition does not preclude carrying cargo and passengers unless otherwise stipulated by the waiver. The priority is to move the airplane to a repair capable facility. One-time flights may include enroute stops when necessary to recover the airplane.

4.5.1.1.1. One-Time Flight to Nearest Repair Capable Facility: Flight is limited to the nearest (shortest enroute time) repair capable base.

4.5.1.1.2. One-Time Flight to Repair Capable Facility: Flight is not restricted to the nearest repair capable base.

4.5.1.2. Mission Dictates Requirement: The PIC is the final authority when determining whether equipment is required for mission accomplishment and should consider the entire mission profile, not just the next leg.

4.5.2. A PIC may request a waiver to depart from a CLS location if parts are available, but the delay would be unacceptable for mission completion.

4.6. Gear Down Flight Operations. Limit gear down flight operations to sorties required to move the aircraft to a suitable repair facility. Consider gear down flight only after the PIC exhausts all avenues to repair the aircraft in place.

Chapter 5

OPERATIONAL PROCEDURES

5.1. Duty Station. Both pilots will be in their seats during flight, except one may be out of their seat for brief periods to meet physiological needs and aircrew duties. With both pilots in their seats, PICs may authorize rest periods for one pilot occupying a primary duty station during non-critical phases of flight. The other pilot will be awake and alert.

5.2. Cockpit Entry. Aircrew members will not permit passengers or observers access to primary crew positions. **(T-2)**

5.3. Takeoff and Landing. An AC, or above, will occupy either the left or the right seat during all takeoffs and landings. **(T-2) Exception:** An FP acting as an AC during an OME may perform takeoffs and landings with an FP in the other seat. The designated PIC (A code) is not required to occupy a primary position, but still retains overall authority for conduct of the mission.

5.3.1. Conditions permitting, a current and qualified pilot certified as an AC, IP, or EP will accomplish all takeoffs, approaches, and landings under the following conditions:

5.3.1.1. Aircraft emergencies.

5.3.1.2. When operating to or from airfields requiring airfield-related waivers. **Exception:** On OMEs transiting an airfield requiring a waiver, the OG/CC determines if an AC is required for the landing, taxi, or takeoff.

5.3.2. If the PIC has less than 100 primary assigned aircraft (PAA) hours since AC certification, FPs will not accomplish takeoffs and landings under any of the following conditions: **(T-3)**

5.3.2.1. Ceiling/visibility less than 300 ft and/or RVR 4000 ft/1200m (3/4 statue mile (SM)/1200m visibility).

5.3.2.2. RCR less than 12.

5.3.2.3. Crosswind component greater than 15 knots.

5.4. Landing Gear and Flap Operation. The pilot flying (PF) commands configuration changes. The pilot monitoring (PM) verifies appropriate airspeed and acknowledges the command prior to system operation. The pilot in the right seat operates the landing gear selector switch. The PM operates the flap lever. **Exception:** During touch-and-go landings, the EP/IP may activate the flaps as PF and will brief this exception prior to the touch-and-go. Both PF and PM visually confirm the landing gear position lights and/or flap position indicator agree with the selected position following system operation.

5.5. Outside Observer/Jump Seat Duties. Available aircrew members will assist in clearing during taxi operations and any time the aircraft is below 10,000 ft mean sea level.

5.6. Seat Belts. All aircrew members will have seat belts fastened when occupying a crew position unless crew duties dictate otherwise. **(T-3)** Shoulder harnesses will be fastened for critical phases of flight. **(T-3)**

5.7. Portable Electronic Devices (PEDs). Follow PED procedures IAW AFMAN 11-202V3. Aircrew members may use USB charging ports during all phases of flight and will ensure that

charging cords do not interfere with flight control movement. PICs may permit passengers to use the USB charging port, but aircrew usage is the priority.

5.8. Stabilized Approach. Conduct stabilized approach procedures IAW AFMAN 11-202V3_AMCSUP. formal training units train students to ensure they understand and are capable of complying with stabilized approach criteria. FTU instructors must use their expertise and experience to only deviate from the guidelines of stabilized approach criteria as required during appropriate instructional scenarios.

5.9. Runway, Taxiway, and Airfield Requirements.

5.9.1. Minimum Taxiway and Runway Requirements. Minimum taxiway width is 35 ft. Standing taxiway waivers may be found in the Giant Report and may approve operations on specific taxiways less than 35 ft. Minimum runway width is 70 ft. Minimum usable runway length (limited by applicable declared distances) is 5,000 ft/1525m or 6,000 ft/1830m for touch-and-gos. If operationally necessary, shorter runways are permitted provided:

5.9.1.1. A qualified IP or EP will perform the takeoff and landing.

5.9.1.2. Operations will be limited to daytime.

5.9.1.3. Runway available (limited by applicable declared distances) will not be less than 4,500 ft/1370m.

5.9.2. Runway Length for Takeoff and Landing. Do not takeoff if takeoff distance adjusted for Runway Condition Reading (RCR) exceeds runway available (limited by applicable declared distances). Minimum runway for landing is landing distance corrected for RCR, based on a threshold crossing height of 50 ft.

5.9.2.1. Runway Length for Takeoff and Intersection Takeoffs. Normally, the PF initiates takeoffs from the beginning of the approved usable portion of the runway. The decision to make intersection takeoffs rests solely with the PIC. Pilots may accomplish intersection takeoffs provided the operating environment (i.e., gross weight, obstructions, climb criteria, weather, etc.) allows a safe takeoff and departure. Calculate takeoff performance based on the runway remaining from the point at which the takeoff is initiated.

5.9.2.2. During operations on runways partially covered with snow or ice, base takeoff computations on the reported Runway Surface Condition (RSC) or RCR for the cleared portion of the runway. A minimum of 25 ft on either side of centerline must be cleared. If 25 ft either side of centerline is not cleared, compute takeoff data based on the uncleared portion up to 25 ft either side of centerline.

5.9.3. Arresting Cables.

5.9.3.1. PICs will ensure aircraft do not contact non-recessed arresting cables above 10 knots. **(T-3)** Crews should request cables be de-rigged/removed if conditions would require higher speed contact.

5.9.3.2. Do not takeoff or land when contact will be made with an arresting cable that has been reported as slack, loose, or improperly rigged.

5.9.3.3. Do not land on (touchdown on) non-recessed approach end arresting cables.

5.9.3.4. Pilots planning to land just beyond a raised cable may consider up to the first 1,000 ft of runway prior to the approach end cable as available to meet the requirements of **paragraph 5.9.1** and **paragraph 5.9.2**. Pilots planning to cross the cable at 50 ft will consider the approach end cable as the runway threshold for calculating landing runway available.

5.10. Runway Assessment and Condition Reporting. Federally obligated airports report runway conditions using the Runway Condition Assessment Matrix (RCAM). Numerical Runway Condition Codes (RwyCC) have replaced RCR, RSC, and Mu readings at these airfields and are reported by airfield operations via field condition (FICON) NOTAMs when applicable (>25% overall surface contamination).

5.10.1. Regardless of the method of runway surface condition reporting, comply with T.O. guidance when calculating takeoff and landing data (TOLD). Convert other braking action standards to RCR IAW the RCAM, located in the FLIP Enroute *Flight Information Handbook* (FIH). If a value is not reported, use RCR 23 for dry runways, RCR 12 for wet runways, and RCR 6 for icy runways. RCR values are normally not reported for taxiways and ramps. During periods of reported low RCR, the taxiways and ramps may have an even lower RCR than reported for the runway.

5.10.2. Use the pilot reported braking action terms in the RCAM when providing a PIREP.

5.10.3. The performance charts used to determine braking action are based on concrete runways. For operations on wet, ungrooved runways, use RCR designated as “wet” in the aircraft flight manual for all takeoff and landing data. For operations on grooved runways, use reported RCR. Do not use runways with a reported RCR value less than 6.

5.11. Wind Restrictions. Consider airfields unusable for takeoff and landing when winds (including gusts) are greater than established below:

5.11.1. Maximum operating wind – 50 knots.

5.11.2. Maximum tailwind component – 10 knots.

5.11.3. Crosswinds – Maximum takeoff and landing crosswind component for any RCR 12 or above is 25 knots. Maximum takeoff and landing crosswind components, corrected for RCR, are shown in **Table 5.1**.

5.11.4. The aircraft must be hangared at wind velocities of 85 knots or greater.

Table 5.1. C-21 Takeoff and Landing Crosswind Components.

RCR Values	6	7	8	9	10	11	12 and above
Crosswind Component for Takeoff and Landing	10	12	15	17	20	22	25

5.12. Aircraft Taxi and Taxi Obstruction Clearance Criteria and Foreign Object Damage (FOD) Avoidance.

5.12.1. Aircraft Taxi and Taxi Obstruction Clearance Criteria: See AFMAN 11-218, *Aircraft Operations and Movement on the Ground*, Airfield Suitability and Restrictions Report (ASRR), and MAJCOM SUP (if applicable) for taxi obstruction clearance.

5.12.2. FOD Avoidance. See AFMAN 11-202V3. In addition, crews should:

5.12.2.1. Carefully review airfield layout paying particular attention to taxi routes, turn requirements, and areas for potential FOD.

5.12.2.2. Minimize power settings during all taxi operations.

5.12.2.3. Where practical, avoid 180° turns. If it becomes necessary to accomplish a 180° turn on a narrow runway, the turn should be accomplished at an intersection of a link taxiway or at a designated turn around pad.

5.13. Functional Check Flights (FCFs). Perform FCFs IAW T.O. 1-1-300, *Maintenance Operational Checks and Check Flights*, T.O. 1C-21A-6CF-1, *Functional Check Flight Manual*, DAFI 21-101, *Aircraft and Equipment Maintenance Management*, and applicable MAJCOM 21-series directives. Crews should only perform tasks or functions contained in specific T.O. guidance. If requested to perform a non-standard function, PICs should contact their OG/CC to see if an FCF applies.

5.13.1. The OG/CC is responsible for the wing FCF program. Publish additional guidance in local supplement to this manual. The OG/CC may authorize a partial FCF to check only those systems disturbed by maintenance, an inspection, or modification.

5.13.2. FCF Restrictions. See T.O. 1-1-300 and AFI 21-101.

5.13.2.1. Do not accomplish actual engine shutdown below 5,000 ft above ground level (AGL).

5.13.2.2. Conduct FCFs in day visual meteorological conditions (VMC). OG/CCs may authorize flight through instrument meteorological condition (IMC) to reach VMC (i.e., visual flight rules (VFR) on top), provided the aircraft can depart under VMC and all systems operate properly prior to entering IMC.

5.13.3. The OG/CC certifies highly experienced instructors as FCF aircrew members. The OG/CC determines FCF crew complement after a thorough operational risk management assessment for that specific FCF flight. The OG/CC, or deployed equivalent, may authorize temporary waivers to FCF procedures for aircrew qualification when operationally necessary. Permanent waivers require MAJCOM A3 approval IAW **Chapter 1**.

5.13.4. If a malfunction occurs during a check flight, the OG/CC may subsequently release the aircraft for flight providing the malfunction is not related to the condition generating the check flight, and the original condition operationally checked good.

5.13.5. IAW with T.O. 1C-21A-6CF-1, conditions requiring an FCF include (but are not limited to):

5.13.5.1. Major retrofit modifications.

5.13.5.2. Removal or replacement of moveable flight control surfaces.

5.13.5.3. Major repairs that would affect the flying characteristics of the aircraft.

5.13.5.4. Adjustment, removal, or replacement of major components of the flight control system for which airworthiness cannot be verified by maintenance operational checks.

5.13.5.5. Removal or replacement of both engines.

5.13.6. Stall Flights. A Learjet-trained and certified test pilot (i.e., civilian manufacturer) is required to perform stall series check flights. If two contract pilots are not available, a qualified USAF IP may complete the crew, but will not perform the stall series. The Learjet test pilot will be the PIC for these flights. **(T-2)**

5.13.6.1. Flight authorizations for stall flights conducted at contractor locations should be completed by the government flight representative (GFR) for that location.

5.13.6.2. A Title 14, Code of Federal Regulations, Part 145, *Repair Stations*, location does not have GFRs. For stall flights conducted at these locations, the flight authorization will be completed by the unit supplying the USAF pilot IAW DAFMAN 11-401; the unit will place the civilian contractor pilot on the flight authorization, with the PIC ("A") code.

5.14. Participation in Aerial Events. See DAFI 11-209, *Participation in Aerial Events,* for performance of flyovers, aerial reviews, and single maneuver events. IAW AFMAN 11-246V6, *Aircraft Demonstrations,* C-21 aircraft demonstrations are not authorized.

5.15. Decision Altitude (DA) and Radio Altimeter (RA) Alerting.

5.15.1. Before departure, pilots will set the DA or RA for the briefed emergency return. **(T-3)**

5.15.2. For instrument approaches, pilots will set the DA to the barometric altitude required by the instrument approach procedure (or NOTAM) for the respective approach. **(T-3)**

5.15.3. For visual approaches, pilots will set the RA to 300 ft. **(T-3)**

5.16. Mode S. Ensure flight ID is set in the transponder for every flight. Flight ID must match the flight plan exactly, cannot exceed seven characters, and cannot contain spaces.

5.17. Engine Running Offload and Onload (ERO) Procedures. The PIC is responsible for prior coordination with the mission execution authority, DV travel party, and ground handling personnel before performing an ERO. EROs should normally be performed with the left engine shut down. One aircrew member will assist participants during on/offload and ensure all are aware of engine danger areas. **(T-3)**

5.18. Takeoff and Landing Data (TOLD). Use the AF Form 4040, *C-21 Takeoff/Landing Data (TOLD),* or other MAJCOM-approved form to post takeoff and landing data. PICs will ensure all blocks of the TOLD card (takeoff and landing) are be filled out prior to engine start. **(T-3)** Crews may utilize MAJCOM-approved eTOLD applications (i.e., C-21A eTOLD) as the primary means of calculating TOLD. Both pilots will verify eTOLD input parameters for accuracy, and correct transcription to the posted TOLD card. **(T-3)**

5.19. Fall Protection. Aircrew members are prohibited from climbing onto the upper fuselage. When operational conditions require aircrew members to climb onto wing surfaces, they will do so only when the upper wing surface is dry. PICs will ensure no other personnel (excluding ops/maintenance personnel) are allowed to climb onto the fuselage or wings. **(T-3)**

Chapter 6

AIRCREW PROCEDURES

Section 6A—Pre-Mission

6.1. Aircrew Uniform.

6.1.1. OG/CCs may prescribe aircrew uniform policies based on mission and location requirements. C-21 aircrews are authorized to wear civilian attire and non-fire-retardant uniforms while performing aircrew duties.

6.1.2. OG/CCs determine clothing and equipment to be worn or carried aboard all flights commensurate with mission, climate, and the Foreign Clearance Guide (FCG). Aircrew uniform is directed by unit OG/CC or equivalent as specified in local or MAJCOM supplements to this manual.

6.2. Personal Requirements.

6.2.1. Shot Record. Aircrew members must maintain worldwide shot requirements. **(T-2)**

6.2.2. Driver's License. A valid state driver’s license is required on each TDY where use of US government general purpose vehicles may be necessary. Aircrew members will contact the local airfield manager before driving on the flight line.

6.3. Pre-Mission Actions.

6.3.1. Before transiting areas outside the CONUS, aircrews will review theater-specific information. **(T-3)** The review, at a minimum, should include AFMAN 11-202V3_AMCSUP, AFTTP 3-3.C-21, *Combat Aircraft Fundamentals C-21*, FLIP Area Planning (AP), GDSS, ASRR, Giant Report, Airport Qualification Program (AQP) (if available), and the FCG.

6.3.2. Obtain required customs forms.

6.4. Passenger Restrictions. The PIC will seek approval from HAF/A3M or the medical crew director (MCD) prior to manifesting additional passengers on active mission legs. **(T-3)** For other than revenue or White House missions, PICs will release space available seats on mission legs when no official passengers are aboard. **(T-3)** PICs are encouraged to release maximum space available seats subject to the following restrictions:

6.4.1. Revenue Missions. These are missions for which the using agency (typically a government agency other than DoD) is reimbursing the DoD for use of the aircraft. Space available passengers on revenue missions must be approved 24 hours in advance by HAF/A3M, theater AMD, or JOSAC (as appropriate), and the using agency contract officer through unit C2 agencies. This is essential to ensure proper funding and reimbursement. Consult C2 to determine mission revenue status if in doubt. Congressional delegations (CODEL) are not revenue missions.

6.4.2. White House Support Missions. Space available passengers will generally not be permitted aboard White House support mission aircraft without express permission of HAF/A3M. This is normally due to the security status of the aircraft, which may include positioning and de-positioning legs. When it is necessary to move aircrew members or support personnel on White House support mission aircraft, the WHMO will be advised, and

permission obtained through the unit C2 and HAF/A3M. On de-positioning legs, space available passengers will usually be permitted if the aircraft is no longer required to maintain an upgraded security status.

6.4.3. Billing. Space available passengers on revenue missions may be subject to being billed commercial first-class airfare by the using agency for the applicable route, depending on that agency's policy. If the DV or on-board contract officer releases seats, the PIC must ensure that any additional financial liability for the passengers is specified by the using agency on-board contract officer. PIC will ensure passengers understand and agree to any reimbursement conditions prior to boarding. **(T-3)**

6.5. Aircrew Publications Requirements. As a minimum, primary aircrew members will have in-flight access to the publications listed in **Table 6.1** during all phases of flight. **(T-2)** Electronic flight bags (EFB) with the "All_Global" and "C21" folders satisfy this requirement and may be the primary source of publication reference in-flight, with the exception of T.O. 1C-21A-1CL-1, *Pilots' Abbreviated Flight Crew Checklist*, which must be available in paper format. **(T-2)** Any additional individual aircrew publication requirements may be specified in local supplements.

Table 6.1. Aircrew Publications.

Publication	Aircrew
T.O. 1C-21A-1, *Flight Manual*	PIC
T.O. 1C-21A-1-1, *Flight Manual Performance Data*	PIC
T.O. 1C-21A-1CL-1, *Pilots' Abbreviated Flight Crew Checklist*	Both pilots
AFMAN 11-202V3, *Flight Operations*	PIC
AFMAN 11-202V3, AMC Supplement, *Flight Operations*	PIC
AFMAN 11-2C-21V3, *C-21 Operations Procedures*	PIC

Section 6B—Pre-Departure

6.6. Global Decision Scheduling System Account. Pilots will obtain a GDSS account prior to operating on IFM-planned sorties. **(T-3)** For operational missions, ensure GDSS account is active and will remain active throughout the duration of the mission. Download aircrew departure papers using the GDSS account, Mattermost, or other approved method at locations without an AMC C2 presence.

6.7. Flight Crew Information File (FCIF). Review FCIF IAW AFMAN 11-202V3_AMCSUP. IPs are responsible for briefing applicable FCIFs when flying with SOQ pilots.

6.8. Mission Kits. EFBs contain all forms and publications necessary for safe and efficient conduct of the mission. If paper copies of any of these forms are required to complete the planned mission (TOLD cards, flight authorizations, customs forms, etc.), required copies should be printed prior to departure. Mission kits with printed materials are not required to be prepositioned on the aircraft.

6.9. Route Navigation Kits. The PIC is responsible for the contents of route navigation kits. Kit contents are determined by the mission itinerary. Include all publications, charts, and forms required to fly the mission and comply with all FLIP and FCG requirements. PICs will verify the

currency of route navigation publications prior to departure from home station. **(T-3)** Use of the Aero App EFB application with current data is considered a complete route navigation kit.

6.10. Departure Planning. See AFMAN 11-202V3_AMCSUP and this chapter.

6.10.1. Operations groups must certify all pilots prior to the use of SDPs. This training will be accomplished during Initial Qualification Training (IQT), which will be documented on the Letter of X.

6.10.2. Special Departure Procedure. SDPs provided by Jeppesen Runway Analysis (JRA) (or MAJCOM-approved equivalent) are approved for use.

6.11. Adverse Weather.

6.11.1. The C-21 is a Category II aircraft for turbulence. Crews should confirm the type of aircraft the forecast turbulence applies to, or what type of aircraft reported the encounter, to gain a more accurate picture for their route of flight. Turbulence category charts are found in AFH 11-203V2, *Weather for Aircrews-Products and Services*.

6.11.2. Cold Weather Altimeter Corrections. See AFMAN 11-202V3. Additionally, the C-21 Flight Management System (FMS) temperature compensation feature may be used to calculate cold weather altimeter corrections.

Section 6C—Preflight

6.12. Hazard Identification and Mitigation. The PIC should brief the entire crew on expected mission hazards and mitigation methods prior to the first engine start of the day.

6.13. Aircrew Flight Equipment (AFE) Requirements.

6.13.1. Oxygen. PICs will ensure oxygen on board for takeoff is sufficient to accomplish the planned flight from the Equal Time Point (ETP) to recovery, should oxygen be required (minimum 1550 PSI). **(T-2)**

6.13.1.1. C-21 aircraft will normally have two Protective Breathing Equipment (PBE) devices and eight Emergency Passenger Oxygen Systems (EPOS) permanently pre-positioned on the aircraft.

6.13.1.2. On flights carrying passengers, PICs will ensure EPOSs are in place at each seat. **(T-2)**

6.13.2. Life Preserver Units (LPU) or Personal Floatation Device. PICs will ensure an LPU is within easy reach of each passenger and aircrew member before takeoff on overwater flights (outside gliding distance to land). **(T-2)** For missions carrying children and infants, PICs will ensure the appropriate number and type of life preservers are aboard. **(T-2)**

6.13.3. Life Rafts. On overwater flights, aircrews will carry a life raft when the planned cruising altitude exceeds gliding distance to land using a ratio of 2 miles per 1,000 ft (12:1 glide ratio). **(T-2)** For example, if planned cruising altitude is FL360, a life raft would be required if flying more than 72 miles from land. **Exception:** Departure and arrival corridors temporarily transiting over a body of water do not require a life raft.

6.13.4. Anti-Exposure Suit. When scheduled to conduct operations above 78 degrees North or below 60 degrees, PICs will ensure the aircraft is configured with the appropriate quantity of anti-exposure suits. **(T-2)**

6.14. Flight Management System (FMS) Data Entry. Aircrew members will load and check FMS flight plan entry IAW AFMAN 11-202V3_AMCSUP. When using the dispatch route function or receiving routes via CPDLC, crews will review the route prior to uplink, then manually input appropriate departure and arrival procedures for the correct runway.

Section 6D—Enroute

6.15. Weather Forecasts. Significant meteorological information (SIGMET) and National Weather Service in-flight weather advisories are issued for large areas. Contact an appropriate military weather facility or flight service station to determine mission applicability and impact.

Section 6E—Arrival

6.16. Instrument Approach Procedures.

6.16.1. In FAA airspace, the C-21 is a category C aircraft. Crews are not authorized to fly an instrument approach using a lower category. **(T-0)** If approach speeds exceed 140 knots indicated airspeed, use appropriate higher category minimums. **(T-0)** Consult appropriate FLIP and AFMAN 11-202V3 for International Civil Aviation Organization (ICAO) categories.

6.16.2. Flight Instrumentation Requirements.

6.16.2.1. Full flight instrumentation for a Category I Instrument Landing System (ILS), for the pilot flying the approach, consists of an attitude indicator, a course deviation indicator, a means to identify the NAVAID (either aurally or by verifying the correct station identifier on the Distance Measuring Equipment (DME) indicator), complete differential pressure instruments, and heading/compass systems.

6.16.2.2. Full flight instrumentation for a precision approach radar (PAR), for the pilot flying the approach, consists of complete differential pressure instruments, heading/compass systems, and an attitude indicator.

6.16.3. Category I ILS Procedures. Decision height for precision approaches will be as published, but no lower than 200 ft height above touchdown (HAT), unless the approach is an ILS SA CAT I approach.

6.16.4. ILS Precision Runway Monitor (PRM) Approaches. Both pilots must be certified to conduct an ILS/PRM approach. Refer to AFMAN 11-2C-21V1, *Aircrew Training*, for certification procedures. Comply with the following operational procedures:

6.16.4.1. Two operational very high frequency (VHF) communication radios are required.

6.16.4.2. The approach must be briefed as an ILS/PRM approach.

6.16.4.3. If unable to accept an ILS PRM approach clearance, contact the FAA ATCSCC prior to departure time to obtain a pre-coordinated arrival time. Pilots who arrive at a PRM airport unable to accept PRM approach clearance, which did not contact ATC prior to departure, should expect an ATC directed divert to a non-PRM airport.

6.16.4.4. All breakouts from the approach must be hand flown. Autopilots will be disengaged when a breakout is directed.

6.16.4.5. Should a Traffic Collision Avoidance System (TCAS) Resolution Advisory (RA) be received, the pilot will immediately respond to the RA. If following an RA requires deviating from an ATC clearance, the pilot will advise ATC as soon as practical. While following an RA, comply with the turn portion of the ATC breakout instruction unless the pilot determines safety to be a factor.

6.16.5. Non-Directional Beacon (NDB) Procedures. NDB approaches should be backed up with available NAVAIDS/ Global Positioning System (GPS) to include loading the NDB approach in the FMS.

6.16.6. Area Navigation (RNAV) Procedures. Aircrews are permitted to fly RNAV approaches IAW **Table 6.2**.. The C-21 possesses a suitable RNAV system as defined in FAA Advisory Circular 90-108, *Use of Suitable RNAV Systems on Conventional Routes and Procedures*, and may be used as a substitute or alternate means of navigation on conventional routes and procedures IAW AFMAN 11-202V3 and T.O. 1C-21A-1.

6.16.6.1. RNAV approaches may be flown to lateral navigation (LNAV) minimum descent altitude (MDA) using vertical navigation (VNAV) procedures to a derived decision altitude (DDA) (DDA = LNAV MDA + 50ft.).

6.16.6.2. DME/DME is not authorized for stand-alone RNAV departures or arrivals (Standard Instrument Departures (SID)/Standard Arrival Routes (STAR)) or RNAV or RNAV(GPS) approaches.

6.16.7. See **Table 6.2** for complete listing of C-21 communication, navigation, surveillance (CNS)/air traffic management (ATM) approved operations.

Table 6.2. C-21 CNS/ATM Operational Approvals.

Airspace/Equipment Type	Aircraft Certified	Operational Approval	Training Required	Notes
FM Immunity	Yes	N/A	No	
8.33 kHz Spacing VHF Voice Radios	Yes	N/A	No	
High Frequency (HF) Voice	Yes	N/A	No	
FANS 1/A+ Over ACARS	Yes	Yes	Yes	1
CPDLC (Required Communication Performance (RCP) 240)	Yes	Yes	Yes	1
ADS-C (Required Surveillance Performance (RSP) 180)	Yes	Yes	Yes	1
Datalink Sub-Network (VDL M0/A, VDL M2, SATCOM (SBD Iridium))	Yes	Yes	No	
ACARS ATS	Yes	Yes	No	
ATN B1 (Link 2000+)	Yes	No	N/A	
ATN B2	No	No	N/A	
ADS-B Out	Yes	Yes	No	

Mode 3A, C	Yes	N/A	No	
Mode S	Yes	N/A	No	
TCAS II Version 7.0	Yes	N/A	Yes	1
Terrain Awareness Warning System	Yes	N/A	No	
Reduced Vertical Separation Minimums (RVSM)	Yes	Yes	Yes	1
NAT HLA (Formerly MNPS)	Yes	Yes	Yes	2
Oceanic and International Procedures	N/A	Yes	Yes	2
RNAV 10 (Required Navigation Performance (RNP) 10)	Yes	Yes	No	
RNP 4	Yes	Yes	No	
RNAV 5 (B-RNAV, RNP 5)	Yes	Yes	No	3
P-RNAV	Yes	Yes	No	
RNAV 2, RNAV 1 (Includes Q- & T-routes, ODPs, SIDs & STARs)	Yes	Yes	Yes	1
RNP-1, RNP-2, RNP-0.3	Yes	Yes	No	
RNAV on Conventional Terminal Procedures	Yes	Yes	No	
Advanced RNP (A-RNP)	Yes	Yes	Yes	4, 5
RNAV (GPS) Approach (RNP Approach ≥0.3 nautical miles (NM))	Yes	Yes	No	5, 6
LNAV Minimums	Yes	Yes	No	
LNAV/VNAV Minimums	Yes	Yes	Yes	1
Baro-VNAV	Yes	Yes	Yes	1
LPV Minimums	Yes	Yes	Yes	1
LP Minimums	No	No	N/A	
Authorization Required Approach: “RNAV (RNP)”, “RNP AR”, “RNP AR APCH”, or “SAAAR”	No	No	N/A	

Notes:
1. Training incorporated into IQT.
2. Training incorporated into MCT.
3. See **paragraph 9.4.4**.
4. This installation does not support fixed radius turns (FRT).
5. Radius to Fix (RF) legs must be flown with the autopilot coupled.
6. Procedures with Missed Approach RNP <1NM are not approved.

Chapter 7

AIRCRAFT SECURITY

7.1. General. This chapter provides guidance on aircraft security and preventing and resisting aircraft hijacking. AFI 13-207-O, *Preventing and Resisting Aircraft Piracy (Hijacking) (FOUO)*, DAFI 31-101, *Integrated Defense*, and specific MAJCOM security publications contain additional guidance. Aircrews will not release information concerning hijacking attempts or identify armed aircrew members or missions to the public. **(T-2)**

7.2. Protection Level. The C-21 is a Protection Level 4 (PL-4) resource. Aircraft security at non-US military installations is the responsibility of the controlling agency.

7.3. Procedures. The following security procedures implement DAFI 31-101 requirements for C-21 aircraft:

7.3.1. The aircraft will be parked in an established restricted area and afforded protection IAW DAFI 31-101. When the DV is a Code 4 (3-star general or civilian equivalent) or above, follow these procedures.

7.3.1.1. Parking Locations**.** Park DV aircraft in a prominent area so maintenance personnel and security forces patrols can closely monitor.

7.3.1.2. Notification Procedures**.** Establish procedures to inform security forces of the arrival, parking arrangements, and departure of all DV aircraft.

7.3.2. At non-US military installations, the PIC determines the adequacy of local security capabilities to provide aircraft security commensurate with this chapter. If security is determined to be inadequate, the aircraft should depart to a station where adequate security is available.

7.3.3. The security force must be made aware of all visits to the aircraft. The security force POC must be identified to the PIC.

7.3.4. Non-Secure Ramps. When remaining overnight on a non-secure ramp, lock the aircraft main door and tailcone access door, and install the locking pin in the emergency exit window.

Chapter 8

TRAINING AND OPERATING LIMITATIONS

8.1. Passengers on Training Missions.

8.1.1. Passenger restrictions in this chapter do not apply to mission essential personnel.

8.1.2. Pilots will not conduct initial qualification or re-qualification with passengers onboard. **(T-2)**

8.1.3. MQT, OMEs, and off station trainers may carry passengers only if the aircrew in training is qualified (current C-21 AF Form 8).

8.1.4. Pilots will not perform touch-and-go landings or multiple approaches with passengers onboard. **(T-2) Exception:** When approved by the MAJCOM, maintenance personnel and civilian employees, under direct contract to the DoD and engaged in official direct mission support activities, are considered "mission essential." These personnel may be onboard when touch and-go landings are performed provided the mission is a designated training flight and an IP or EP is in command.

8.2. Touch-and-Go Landing Limitations.

8.2.1. Touch-and-go landings will only be accomplished under the direct supervision of an IP.

8.2.2. Minimum usable runway length (limited by applicable declared distances): 6,000 ft/1830m.

8.2.3. Minimum ceiling: 300 ft.

8.2.4. Minimum visibility: 3/4 SM/1200m (RVR 4000 ft/1200m).

8.2.5. Minimum RCR: 12.

8.2.6. Do not accomplish touch-and-go landings on slush covered runways.

8.2.7. Maximum crosswind component: 25 knots.

8.2.8. Touch-and-go landings are prohibited with cargo onboard. **Exceptions:**

8.2.8.1. Routine mail may be onboard provided it is properly secured in the baggage area.

8.2.8.2. Aeromedical evacuation (AE) equipment is not considered cargo.

8.2.8.3. Mission impaired capability awaiting parts (MICAP) may be accepted and carried provided there is no risk to damage of the cargo and the Air Terminal Operations Center representative agrees to the flight conditions. MICAP must be secured in the baggage area and not adversely affect the aircraft center of gravity.

8.3. Training on Operational Missions. Crews may perform multiple approaches and touch-and-go landings on operational missions provided the following requirements are met:

8.3.1. Pre-Mission Coordination Requirements. Activity must be approved by C2 tasking/scheduling authority (HAF/A3M, JOSAC, etc.) and training charged to unit. PICs will also coordinate with and receive approval from the squadron Operations Officer. As part of pre-mission planning, PICs should contact parent unit Current Operations and obtain training mission number(s) for use at each enroute location(s) where training events are planned. PICs

should then coordinate with the C2 tasking/scheduling authority to ensure adequate ground time is available at planned training locations to allow for planned training events, clearing customs, required crew rest, etc. Once complete, wing Current Operations coordinates to re-cut the mission and add the training mission number(s) in GDSS.

8.3.2. Upon initial arrival at the training location, close out the current line on the AFTO Form 781 and log the training time on the next line using the appropriate training mission symbol and number.

8.4. Simulated Emergency Flight. Conduct simulated emergencies IAW AFMAN 11-202V3_AMCSUP and this manual. PICs will limit simulated emergencies to non-critical phases of flight. **(T-3)**

8.4.1. Unless specifically authorized elsewhere in this chapter, aircrews will not practice emergency flight procedures that degrade aircraft performance or flight control capabilities in the aircraft. **(T-2)** Partial/no flap landings are not considered emergency procedures unless accompanied by a flap malfunction.

8.4.2. Simulated Engine-Out Limitations. Do not perform simulated engine-out training in the aircraft. **Exception:** The OG/CC may approve simulated engine-out training in the aircraft on a case-by-case basis. This exception is not intended to replace the use of the simulator.

8.4.2.1. When single engine operations in the aircraft are approved, landings may be performed with one thrust lever in idle. Simulated engine failure is not authorized at less than engine-out minimum control speed as published in the flight manual, during circling, or during no-flap approach and landings.

8.4.2.2. Use both engines for all unplanned go-arounds.

8.5. Flight Maneuvers. Reference **Table 8.1** for additional training flight restrictions. Aircrews will practice the following maneuvers in the simulator only. **(T-2) Exception:** Maneuvers required for FCF or FCF training are authorized in flight.

8.5.1. Simulated engine-out takeoffs.

8.5.2. Full Stalls. **Note:** Stall series FCFs in the aircraft must be flown by a Learjet-certified stall series pilot. See **paragraph 5.13.6**.

8.5.3. Approach to stalls, slow flight, and flight on the backside of the power curve.

8.5.4. Dutch rolls.

8.5.5. Jammed stabilizer approach and landing.

8.5.6. Split flap landings.

8.5.7. Landing with anti-skid off.

8.5.8. Landing with inoperative hydraulic system.

8.5.9. Aborted takeoffs.

8.5.10. Unusual attitudes.

8.5.11. Emergency descents.

8.5.12. Runaway pitch or roll trim, yaw demonstrations.

8.5.13. Emergency brake landing.

8.5.14. Dual engine failure.

8.5.15. Engine shutdown.

8.5.16. Engine-out circling approach.

8.6. Briefing Requirements. Use MAJCOM or locally approved briefing/debriefing guides.

Table 8.1. Training Flight Restrictions.

Maneuver	Altitude	Remarks
Missed Approach (MA)	MDA/DA	Initiate MAs no lower than the minimum altitude for the type of approach executed.
Planned Go-Around (GA)	Initiate at or above 100 ft AGL	Practice balked landings may be initiated below 100 ft AGL.
Restricted Low Approach	No lower than 500 ft AGL	
Any Simulated Emergency (except engine failure)	Initiate above 500 ft AGL	
Simulated Engine Failure	Initiate above 1,000 ft AGL. Do not initiate after beginning gear/flap extension.	Clean configuration Day/VMC Only
Simulated Single Engine MA/GA	MDA/DA, no lower than 300 ft AGL	For unplanned GAs from simulated single-engine approaches, or if single engine MA occurs below 300 ft AGL, use BOTH throttles during MA/GA maneuver.

Chapter 9

NAVIGATION PROCEDURES

9.1. General. This chapter establishes procedures and requirements for worldwide enroute C-21 navigation. It is intended to be used in conjunction with procedures and requirements in AFMAN 11-202V3, FCG, FLIP, Aeronautical Information Publications (AIP), and ICAO Document 7030, *Regional Supplementary Procedures (SUPPS)*.

9.2. Mission Planning.

9.2.1. Flight Plan. Cross-check the flight planned route against the route of flight entered on the DD Form 1801, *DoD International Flight Plan*, and approved diplomatic clearances.

9.2.2. Flight Planning Navigation Database. Flight plans created using commercial flight planning tools (e.g., ARINC Direct) use their own commercial navigation databases. Pilots are responsible for ensuring the accuracy of the flight plan waypoints against current aeronautical charts, terminal instrument procedures, or FLIP documents.

9.2.3. While the C-21 is capable of displaying magnetic and true heading information, it is not approved for operating in the area of magnetic unreliability (AMU). There are areas of Canada outside the AMU where NAVAIDS are oriented to true or grid north and true tracks apply, even on airways. The C-21 is authorized to operate in areas outside the AMU with NAVAIDS oriented to true or grid north. A thorough review of extreme latitude navigation in AFMAN 11-202V3 is required prior to flight in these areas.

9.2.3.1. OG/CC approval is required to operate in areas outside the AMU, but above 73° North or below 60° South due to limitations of the magnetic variation database in the FMS.

9.2.3.2. True or grid north instrument approach procedures (except RNAV GPS) are limited to day VMC only.

9.2.3.3. RNAV approaches based on true or grid north are allowed during night or IMC, provided the published RNAV procedure includes all required magnetic heading information, the procedure is in the aircraft database, and all other normal RNAV requirements are met.

9.3. Oceanic and Remote Airspace. See AFMAN 11-202V3. In addition:

9.3.1. All aircrews transiting remote or oceanic areas will accomplish the procedure outlined below prior to the first sortie of the day that will transit an area where GPS is the only means of navigation. **(T-2)**

9.3.1.1. Review T.O. 1C-21A-1 procedures for both normal and abnormal operations of the FMS (i.e., Power Failure).

9.3.1.2. Prior to oceanic flights, plot the oceanic portion on an appropriate plotting chart IAW AFMAN 11-202V3_AMCSUP, and compute an ETP.

9.3.1.2.1. Use data from your computer flight plan (CFP) to determine distances and wind factors. The wind factors shown are the average (AWF) for the entire route and the first (WF1) and second (WF2) halves of the flight. Keep in mind the portion of the flight between suitable landing fields may not coincide with the first and second halves

of the flight or your remote/oceanic routing (an alternate airfield may be closer to the side of your route). **Note:** The differences in the two-engine normal and single-engine long range cruise profiles are significant. Therefore, special attention during mission planning should be given to determining turnaround point if required due to engine loss. The single-engine long range cruise ETP moves upwind of the two-engine ETP by as much as 30%.

9.3.1.2.2. Crosscheck altimeters before or immediately upon coast out. Record readings of primary and standby altimeters.

9.3.1.2.3. When approaching each waypoint, recheck coordinates for the next waypoint.

9.3.1.2.4. Upon return to home station, turn in charts and CFPs to Squadron Stan/Eval. Squadron Stan/Eval will retain the charts, CFPs, and associated materials for a minimum of three months. **(T-2)** Electronic copies of these materials are acceptable.

9.3.2. Report all FMS navigation anomalies through unit Stan/Eval regardless of location or airspace type. Operations Group Stan/Eval (OGV) forwards reports to MAJCOM Stan/Eval who forwards to AMC/A3V as the lead command.

9.4. Navigation Capability and Airspace Requirements.

9.4.1. RVSM Airspace. Refer to FLIP AP for theater unique information and the following for RVSM requirements:

9.4.1.1. Both primary altimeters, at least one autopilot, the altitude advisory system, and the transponder, must be fully operational. Request a new clearance to avoid this airspace should any of this equipment fail.

9.4.1.2. Engage the autopilot during level cruise, except when circumstances such as the need to re-trim the aircraft or turbulence require disengagement.

9.4.1.3. Continuously crosscheck the primary altimeters to ensure they agree ± 200 ft.

9.4.1.4. Limit climb and descent rates to 1,500 ft/min when within 1,000 ft of assigned level to reduce likelihood of a TCAS resolution advisory.

9.4.2. Reference FLIP General Planning to assess current Aircraft Designation and TD Code Suffix. Notify ATC of all updates to your originally filed navigation/transponder capabilities.

9.4.3. Required Navigation Performance (RNP). Pilots will immediately notify ATC if any of the required equipment fails after entry into RNP-10 airspace and coordinate a plan of action. Document in the aircraft forms malfunctions or failures of RNP required equipment.

9.4.4. RNAV-5 Airspace. The C-21 is approved for RNAV-5 airspace operations. Airspace where RNAV-5 is applied is considered special qualification airspace. RNAV-5 meets a track keeping accuracy equal or better than +/- 5 NM for 95% of the flight time but does not specify a containment (onboard performance monitoring and alerting) requirement.

9.4.4.1. The minimum equipment to operate in this airspace is an approved GPS with RAIM provided that the system is monitored by the flight crew and that in the event of a system failure, the aircraft retains the capability to navigate with use of another GPS receiver, FMS, or ground-based NAVAIDs (i.e., VOR, DME, and NDB).

9.4.4.2. Pilots will immediately notify ATC if any of the required equipment fails after entry into RNAV-5 airspace and coordinate a plan of action. With sufficient ground-based NAVAID reception, the C-21 may continue to operate in RNAV-5 airspace. **Note:** Basic Area Navigation (B-RNAV) in Europe, or RNP-5 in the Middle East (where still used) airspace designations are phasing out of use and are considered equivalent to RNAV-5.

9.4.5. FM Immunity (FMI). The C-21 is equipped with dual FMI VHF navigation receivers and is considered fully compliant. Refer to the applicable FLIP AP series for more information concerning FMI operations.

9.4.6. Precision Positioning Service (PPS). No operational approval exists for the use of encrypted PPS for instrument flight rules navigation in civil controlled airspace. Crews will use GPS standard positioning service (SPS) unless specifically authorized by MAJCOM Stan/Eval.

Chapter 10

AIRCREW MAINTENANCE SUPPORT PROCEDURES

10.1. General. This chapter contains aircrew procedures not contained in the flight manual, other portions of this publication, or other publications.

10.2. Aircraft Servicing and Ground Operations. Aircrew are normally not required to service the aircraft in the CONUS; however, they are qualified and authorized to perform those aircrew maintenance support tasks found in this volume. Crews may assist the normal maintenance function when critical contingency taskings dictate, provided this action does not impact crew duty and crew rest limits specified in **Chapter 3** of this manual.

10.2.1. Aircraft Refueling. Aircrew members are qualified in ground refueling and may perform refueling duties. Aircrews should only refuel in the event maintenance support is not readily available. Crews are routinely required to accomplish refueling operations at OCONUS non-military locations.

10.2.1.1. Avoid refueling with JP-8+100 while transiting airfields with JP-8+100 capabilities. AMC aircraft are not allowed to operate on JP-8+100, except in emergency conditions. All JP-8+100 locations are required to maintain a clean JP-8 capability to support transient aircraft. If inadvertent refueling with JP-8+100 occurs comply with the following:

10.2.1.1.1. De-fuel the aircraft prior to flight.

10.2.1.1.2. Make an AFTO Form 781 entry stating “Caution: Aircraft refueled using JP-8+100, preventative measures must be taken when de-fueling.”

10.2.1.2. When aircrew members are required to refuel, a pilot acts as the refueling team supervisor and complies with T.O. 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding (ATOS)*, and applicable C-21 series T.O.s.

10.2.2. Concurrent Ground Operations. See AFMAN 11-202V3_AMCSUP.

10.2.3. Aircrew Dash One Preflight Inspection Requirements. The aircrew dash one preflight inspection remains valid until either: seventy-two (72) hours from the time of inspection or another maintenance dash six preflight inspection is performed.

10.2.4. Fire Protection and Crash Rescue. A fire bottle, if available, should be positioned near the front of the aircraft prior to starting engines.

10.2.5. Aircrew and Maintenance Engine Runs. A mixture of aircrew and maintenance personnel should not normally accomplish engine runs. When an aircrew member is required to start or run up engines for maintenance purposes, maintenance personnel accomplish all necessary inspections and preparations for the engine run. These actions include but are not limited to; intake/exhaust inspections, access panel security servicing, and AFTO Form 781 documentation.

10.3. Aircraft Recovery Away from Main Operating Base. The PIC is responsible for ensuring the aircraft is turned to meet subsequent mission taskings. If qualified maintenance specialists are unavailable, the aircrew is responsible for turning the aircraft to meet subsequent mission taskings.

10.3.1. The PIC is responsible for the recovery items including:

10.3.1.1. Parking and receiving.

10.3.1.2. Aircraft servicing, including aircraft ground equipment (AGE) usage.

10.3.1.3. Supervision of minor maintenance within local capability.

10.3.1.4. Minor configuration changes to meet mission tasking.

10.3.1.5. Securing the aircraft before entering crew rest.

10.3.1.6. Coordinating aircraft security requirements.

10.3.1.7. Documenting AFTO 781-series forms.

10.3.2. In all cases where aircrews service the aircraft without qualified maintenance specialist assistance, comply with the appropriate maintenance T.O.

10.3.3. Aircrew members are not qualified to accomplish maintenance inspections. In instances where maintenance personnel are not available, aircrew enter a red dash symbol in the AFTO Form 781H, *Aerospace Vehicle Flight Status and Maintenance*, updating current aircraft status, and enter a red dash symbol and discrepancy in the AFTO Form 781A, reflecting that the applicable maintenance inspection (i.e., preflight, thru-flight, basic post-flight) is overdue.

Chapter 11

CARGO AND PASSENGER PROCEDURES

11.1. General. A pilot coordinates loading and offloading with the Air Terminal Operations Center or the shipping agency, plans cargo loads, and supervises onloading and offloading operations.

11.2. Responsibilities for Aircraft Loading. A pilot is responsible for aircraft preflight, load planning (as required) of all cargo, preparing weight and balance documentation, operating aircraft equipment, tiedown, and checking cargo against manifests. The pilot supervises and directs onloading and offloading and is responsible for safe movement of cargo into and out of the aircraft. The baggage runner should be used whenever baggage is being onloaded or offloaded to protect passenger seats from damage.

11.3. Emergency Exits and Safety Aisles.

11.3.1. Aircrew will ensure that passenger handheld baggage does not extend into the aisleway or block access of personnel to the main door or emergency escape exit. **(T-2)** Any item that does not meet this requirement will be secured so as not to obstruct the aisle.

11.3.2. Due to validated patient requirements, there may be a need for medical equipment to extend into the aisle (e.g., litter patient on the Spectrum with external fixator(s) may protrude into aisle). In coordination with the MCD and C2, the PIC will ensure normal and emergency exit routes will be available for egress. **(T-2)**

11.3.3. In the cargo configuration, the PIC will ensure normal and emergency exit routes will be available for egress. **(T-2)**

11.4. Passenger Missions. PICs will ensure a current passenger manifest is saved to the applicable mission folder prior to departure. **(T-3)**

11.4.1. Passenger Handling. PICs are responsible for required passenger handling duties. Passengers are limited to 30 pounds of baggage unless specific allowance for excess baggage is authorized and planned by the controlling agency. Passengers with excess baggage may be transported after the PIC determines the aircraft weight limitations and mission requirements are satisfied.

11.4.1.1. Accomplish passenger briefings IAW aircraft checklists and approved briefing guides. Passenger briefings will ensure familiarization with life support equipment. For missions with the same passengers manifested over multiple legs, life support equipment is only required to be briefed prior to the first departure.

11.4.1.2. Prior to each flight, formulate a passenger emergency egress plan. Only English-speaking, physically able adults will be seated next to the emergency exit. This is to ensure those passengers are aware of their duties and responsibilities in assisting the crew during emergency egress.

11.4.1.3. Make every effort to enhance passenger comfort.

11.4.1.4. Ensure the highest ranking DV is afforded the seat of preference, and other passengers are aware of the DV’s status.

11.4.1.5. Release space available IAW **paragraph 6.4**.

11.4.2. The baggage runner should be used whenever baggage/cargo is being moved to or from the baggage compartment.

11.5. Loaded Weapons. Weapons are considered loaded if a magazine is installed in the weapon. This applies even though the magazine is empty.

11.6. Weight and Balance. Accomplish weight and balance for this aircraft according to T.O. 1-1B-50, *Weight and Balance*, and T.O. 1C-21A-1-1 procedures. The unit possessing the aircraft maintains the primary weight and balance handbook containing the current aircraft status and provides a supplemental weight and balance handbook for each aircraft. AWBS is the only approved software program for automated C-21 weight and balance computations.

11.7. Procedures for Airlifting Hazardous Cargo.

11.7.1. C-21 aircraft are authorized to transport the following hazardous materials prepared and packaged IAW AFMAN 24-604, *Preparing Hazardous Materials for Military Air Shipments*. See also AFMAN 11-202V3.

11.7.1.1. All Class/Divisions of explosives.

11.7.1.2. Class/Division 2.2 nonflammable aerosols and compressed gases in limited quantities.

11.7.1.3. Class/Division 2.2 nonflammable high-pressure spheres and canisters authorized in support of the USAF and DoD atmosphere research program.

11.7.1.4. Class 8 aircraft batteries required for maintenance support or mobility requirements.

11.7.1.5. Class 9 material (except magnetic material which may affect flight instruments).

11.7.1.6. Medical support equipment and supplies.

11.7.1.7. Hazardous materials accompanying Hammer Adaptive Communication Element personnel.

11.7.1.8. Hazardous materials in “Excepted Quantities.”

11.7.1.9. Consumer commodities.

11.7.2. Other classes/divisions of hazardous materials are prohibited except by a waiver approved by the OG/CC or equivalent. Waiver approval must take into consideration the lack of onboard HAZMAT spill/clean-up kit and lack of cargo jettison capability. Waivers will not be approved for:

11.7.2.1. Class/division 2.1 cryogenics.

11.7.2.2. Class/division 2.3 toxic gases.

11.7.2.3. Class/division 6.1 poisons with an inhalation hazard.

11.7.2.4. Class 7 radioactive material (yellow III).

11.7.3. Procedures in **paragraph 11.7.5** apply when aircraft carry any quantity of the following materials:

11.7.3.1. DoD class or division 1.1, 1.2, 1.3 (explosives).

11.7.3.2. DoD hazard class or division 1.4 (explosives) that transit the United Kingdom, Italy, or Hawaii.

11.7.3.3. Class or division 2.3 (poison gas).

11.7.3.4. Class 4.3 (dangerous when wet).

11.7.3.5. Class or division 6.1, (poison) PG I, zone A and B.

11.7.3.6. Class 7 (radioactive yellow III label).

11.7.3.7. Nuclear weapons, nuclear components, inert devices.

11.7.4. Procedures in **paragraph 11.7.5** also apply to nuclear related cargo, toxic chemical ammunition, highly toxic substances, hazard division 1.1 through 1.3 explosives, and infectious substances (including biological and etiological materials). In addition, it applies to Class 7 (Radioactive materials), which require a yellow III label, and all other hazard classes or divisions, (except class 9 and other regulated material (ORM-D)) when shipped in quantities of 1,000 pounds (455 kilograms) or more aggregate gross weight. **Note:** Quantities not covered in paragraphs **11.7.3** and **11.7.4** are exempt from the procedures in **paragraph 11.7.5**.

11.7.5. The following procedures are established to satisfy the reporting requirements of AFMAN 24-604:

11.7.5.1. The PIC will be briefed when the quantities specified in paragraphs **11.7.3** and **11.7.4** are involved. The briefing will cover the following points:

11.7.5.1.1. Hazard class.

11.7.5.1.2. Proper shipping name.

11.7.5.1.3. DoD class or division when any type explosives are involved.

11.7.5.1.4. Net explosives weight for all DoD class or division 1.1, 1.2, and 1.3 explosives and gross weight of blasting agent aboard the aircraft.

11.7.5.1.5. Gross weight of hazardous materials other than the explosives above.

11.7.5.1.6. Passenger restrictions.

11.7.5.1.7. Written notification indicating prior permission required, obtained from the next base to be transited.

11.7.5.1.8. Smoking restrictions.

11.7.5.1.9. Flight plan annotation requirements.

11.7.5.1.10. Isolated parking and taxiing requirements.

11.7.5.1.11. Security classification, if appropriate.

11.7.5.1.12. Notification of the requirement to contact the next base to be transited at least 30 minutes prior to landing. (Such contact is not required for quantities other than those in paragraphs **11.7.3** and **11.7.4**.).

11.7.5.1.13. Placard requirements.

11.7.5.1.14. Escort team requirement, if applicable.

11.7.5.1.15. Other special handling requirements.

11.7.5.2. Cargo documentation and loading procedures.

11.7.5.2.1. The PIC will ensure proper documentation, certification and identification of cargo is furnished. AFMAN 24-604 contains detailed instructions on packaging, marking, labeling, and certification requirements associated with the airlift of hazardous materials. Hazardous materials/cargo not properly packaged and documented IAW AFMAN 24-604 will be rejected for air shipment by the pilot.

11.7.5.2.2. Hazardous materials/cargo falls into many categories and the utmost precautions must be observed when handling or transporting these items. PICs will ensure all hazardous material is loaded to permit easy access in-flight without moving other cargo. **(T-2)** Adhere to the following appropriate safety precautions when loading hazardous cargo as appropriate:

11.7.5.2.2.1. Ventilate the aircraft.

11.7.5.2.2.2. Placard the aircraft.

11.7.5.2.2.3. No smoking.

11.7.5.2.2.4. Fire extinguishers must be available.

11.7.5.2.2.5. Thoroughly inspect the cargo.

11.7.5.2.2.6. Stow cargo away from heater outlets.

11.7.5.2.2.7. Notify medical personnel in case of damage to radioactive materials.

11.7.5.2.2.8. Use protective clothing and equipment.

11.7.5.3. Before engine start. Remove all placards from the aircraft. Provide controlling C2 agency parking location and approximate engine start time. Verify fire-fighting agency has the following hazardous materials information:

11.7.5.3.1. Class of hazardous material aboard and the DoD class or division for explosive materials aboard.

11.7.5.3.2. Net explosive weight for DoD class or division 1.1, 1.2, and 1.3 explosives.

11.7.5.3.3. Estimated Time of Departure.

11.7.5.4. Before landing. Unless specifically prohibited by the theater commander, FLIP, or FCG, contact the agency specified in FLIP/FCG, base operations dispatcher, control tower or approach control at least 30 minutes (or as soon as practical) before Estimated Time of Arrival (ETA). Inform the agency that “hazardous materials" are onboard and verify hazardous materials/cargo message has been received. Request information is relayed immediately to base operations or the civil airport manager, crash and fire protection agency, and other support activities. If landing at a US civil airport without a tower, provide information to the nearest FAA flight service station. Transmit the following information: mission number, ETA, class of hazardous material, DoD class or division for explosives, net explosive weight, gross weight, and special handling requirements (e.g., isolated parking, security, technical escort teams, etc.).

11.7.5.5. DoD requires aircraft carrying DoD class or division 1.1, 1.2, and 1.3 explosives, hazardous class or division 2.3 or 6.1 zone A materials, and munitions to be parked in areas isolated from non-associated personnel and facilities. When such cargo is aboard, the PIC is responsible for ensuring the cargo is correctly identified to the tower or ground control. If the aircraft is not directed to an isolated area, identify the cargo again to tower or ground control. When identification is acknowledged, the host is solely responsible for selecting the parking area.

11.7.5.6. The military host is responsible for placarding aircraft. When missions operate on non-military bases, the briefing to the PIC will include placarding requirements and, if required, placards will be furnished at the on-load base. The shipper and receiver make prior arrangements with the airport manager for shipments of hazardous materials requiring placarding. The shipper and receiver are responsible for cargo identification, firefighting procedures, and isolated parking requirements.

11.7.5.7. Unscheduled Landing Due to In-flight Emergency. Transmit unclassified information to the appropriate ATC facility as follows:

11.7.5.7.1. Nature of emergency and intent to land.

11.7.5.7.2. Aircraft position and ETA.

11.7.5.7.3. Number of personnel and location in aircraft.

11.7.5.7.4. Fuel on board.

11.7.5.7.5. Hazardous materials aboard, location of the cargo, and information listed in **paragraph 11.7.5.4**.

11.7.5.7.6. After Unscheduled Landing. Contact the appropriate C2 center by telephone, HF radio, or message, giving arrival notice, hazardous materials information, and other pertinent information, as required.

Chapter 12

FUEL PLANNING

12.1. General. This chapter is designed to assist pilots and planners in fuel planning for missions. AMC-approved flight planning software and T.O. 1C-21A-1-1, *Flight Manual Performance Data,* are the primary preflight references. Aircrew and mission planners manage aviation fuel as a limited commodity. Missions should be planned at altitudes and routes to maximize fuel conservation. Consider fuel optimization throughout all phases of mission planning and execution.

12.2. Fuel Planning Procedures. Aircrew should employ the following aviation fuel optimization measures without compromising flight safety or jeopardizing mission/training accomplishment:

12.2.1. Plan fuel to an alternate airfield only when AFMAN 11-202V3 or this publication require the filing of an alternate airfield. Alternate airfield selection is ultimately the PIC's responsibility. In addition to AFMAN 11-202V3 requirements, PICs should plan for alternates which would minimize impacts to a DV's schedule.

12.2.2. Tankering fuel for convenience is prohibited. Fuel tankering deemed operationally necessary by the PIC or C2 will be included in the required ramp fuel load (RRFL). **(T-3)**

12.2.3. Reference AFI 11-253, *Managing Purchases of Aviation Fuel and Ground Services,* when planning for fuel and ground services.

12.3. Fuel Requirements. This section augments AFMAN 11-202V3 fuel requirements.

12.3.1. Required Ramp Fuel Load. As a minimum, RRFL consists of all fuel required for engine start, taxi, takeoff, enroute, enroute reserves, approach, landing, and contingency fuel. Plan fuel load using the CFP or AF Form 70, *Pilot's Flight Plan and Flight Log***, Table 12.1**, and the flight manual. Fuel plans are not required on local training missions remaining within 200 NMs. Additional contingency fuel may be added when deemed necessary by the PIC to prevent disruption to a DV's schedule or AE's mission timing requirements.

12.3.2. Alternate Airfield Fuel. Plan fuel loads for flight from intended destination to alternate airfield at optimum altitude and normal cruise speed. Compute fuel, time, and altitude IAW T.O. 1C-21A-1-1. Reference AFMAN 11-202V3_AMCSUP for remote or island destinations. Plan to arrive at alternate with fuel IAW **paragraph 12.3.3**. Units may develop standard alternate airfield fuel requirements for local training missions; however, these fuel requirements will not be less than those specified in this chapter.

12.3.3. Fuel Overhead Destination/Alternate. Plan to arrive overhead the destination, or alternate, with no less than reserve fuel plus approach and landing, or 1,000 pounds, whichever is greater.

12.3.4. Minimum fuel is 800 pounds. PICs will plan to terminate all missions with not less than 800 pounds. **(T-2)** When operating in FAA airspace, pilots will declare "minimum fuel" to the controlling agency when in their judgment the aircraft may land at the intended destination with less than this amount.

12.3.5. Emergency fuel is 600 pounds. Crews will declare an emergency whenever it is determined that they will land with emergency fuel or less.

12.3.6. Ballast fuel may be required under certain aircraft configurations to keep the center-of-gravity within limits. Unless the PIC can accurately determine when it is safe to transfer the ballast fuel forward, do not plan to utilize this fuel.

12.3.7. Depressurization Fuel. Calculate depressurization fuel IAW AFMAN 11-202V3_AMCSUP to determine if additional fuel must be added to the RRFL.

Table 12.1. C-21 Fuel Planning Chart.

Fuel Planning Category	Quantity (lbs)	Notes
1. Start, Taxi, Takeoff	200	
2. Enroute[1]		Fuel for planned climb, cruise, and descent to overhead destination at initial approach fix altitude.
3. Enroute Reserve		45-minute fuel reserve at destination or alternate (when an alternate is required) IAW AFMAN 11-202V3.
4. Alternate Airfield (if required)[2]		Ceiling & Visibility Criteria: Fuel from overhead destination to the alternate airfield at normal speed and altitude.
		Visibility-Only Criteria: Fuel for descent, approach, and missed approach; use 300 pounds + fuel from destination to alternate airfield using climb and normal cruise charts.
5. Approach and Landing	200	
6. Contingency		15 minutes IAW AFMAN 11-202V3_AMCSUP.
7. Thunderstorm Deviation Fuel[3]	50	5 min at enroute fuel burn rate if forecast thunderstorms are isolated along the route of flight.
	100	8 min at enroute fuel burn rate if forecast thunderstorms are few along the route of flight.
	200	15 min at enroute fuel burn rate if forecast thunderstorms are scattered or numerous along the route of flight.
8. Hold Down/Early Descent[4,5]	200	Reference the current AMC Flight Planning Fuel Policy Letter

Notes:
1. Include all planned off-course maneuvering for departure or enroute deviations.
2. When two alternate airfields are required, compute fuel from the destination to the most distant alternate airfield only.
3. Add only the highest applicable Thunderstorm Deviation Fuel when dictated by weather forecasts. Thunderstorm corrections are not cumulative.
4. Hold down fuel is added as a departure bias and will be burned at the top of climb. Hold down fuel is annotated on the Advanced Computer Flight Plan/Mobility Air Forces Automated Flight Planning Service (ACFP/MAFPS) as “Fuel D” and accounted for in the top of climb fuel block.
5. Early descent fuel is added as an arrival bias and will be burned on the last leg. Early descent fuel is annotated on the ACFP/MAFPS as “Fuel D” and accounted for in the last leg fuel block.

Chapter 13

EMPLOYMENT

13.1. General. Planners and aircrews should reference AFTTP 3-3.C-21 for additional mission planning guidance. **Note:** Certain technical information was intentionally omitted or generalized to keep this chapter unclassified. Users should be aware that written additions to any portion of this document could cause it to become classified. Reference **Table 13.1** and **Table 13.2** for tactical arrival and departure restrictions.

13.2. Checklists. Complete the Combat Entry/Exit checklists at a convenient time prior to entering and upon departing the threat environment. The combat entry/exit points are determined by theater guidance or known/suspected weapons engagement zone.

13.3. Approaches. Refer to AFTTP 3-3.C-21 for tactical approach techniques. Remain unpredictable: where multiple options are available, select the approach which best minimizes exposure to the threat while still allowing a high probability of landing on the first approach.

13.3.1. The normal overhead pattern is not considered a tactical approach and may be flown at night and/or with passengers onboard.

13.3.2. Passengers are not permitted when performing tactical maneuvers for training or currency.

13.3.3. When performing tactical maneuvers for currency or semi-annual training on operational missions, both pilots must be certified and current in tactical maneuvers.

Table 13.1. Tactical Arrival Procedures and Restrictions.

Approach Type	Training/Operational Restrictions
Low Altitude Tactical Straight-In Approach	VMC, Day Only
High Altitude Tactical Straight-In Approach	VMC, Day or Night
Random Steep Approach	
Tactical Downwind and Tactical Base Approach	
Tactical Slowdown Maneuver	

13.4. Departures. Consult AFTTP 3-3.C-21 for specific descriptions of the maneuvers listed in **Table 13.2**.

Table 13.2. Tactical Departure Procedures and Restrictions.

Departure Type	Training/Operational Restrictions
Tactical Random Departure	VMC, Day Only
Spiral-Up Departure	VMC, Day or Night

Chapter 14

AEROMEDICAL EVACUATION

14.1. Refueling Operations. Accomplish concurrent servicing IAW T.O. 00-25-172 and AFMAN 11-2AEV3, *Aeromedical Evacuation (AE) Operations Procedures*, Addenda A.

14.1.1. Concurrent servicing is only recommended if:

14.1.1.1. Moving a patient would increase risk by an additional move off and back on the aircraft; or

14.1.1.2. No suitable location exists on the airfield to house the patient during refueling; or

14.1.1.3. No suitable transportation is available to move the patient from the aircraft; or

14.1.1.4. The patient would be exposed to inclement weather.

14.1.2. Aircrew members will ensure the aircraft door remains open during all phases of the refueling operation if patients remain onboard. **(T-3)** External power may be applied and cockpit AEROMED switches may be placed to the ON position prior to the start of refueling operations. However, medical life support equipment can still operate with all aircraft power removed during refueling operations.

14.1.3. A C-21 pilot must remain at the aircraft at all times during concurrent servicing. **(T-3)**

14.2. Aircraft Configuration.

14.2.1. On dedicated AE missions, configure the aircraft during pre-flight.

14.2.2. Litter Support Provisions.

14.2.2.1. Load planning will be according to theater guidelines for C-21 aircraft.

14.2.2.2. When a Spectrum unit is required, pilot assistance will likely be necessary at non-military OCONUS locations for patient loading. For patient transportation procedures refer to AFMAN 11-2AEV3, and AFMAN 11-2AEV3, Addenda A.

14.2.3. Available litter spaces and ambulatory seating depends on the aircraft cabin’s mission configuration.

14.2.4. Therapeutic Oxygen. Unless the aircraft has the Spectrum or other approved system installed, therapeutic oxygen is not available and must be brought onboard for patient use. If needed, use the Patient Therapeutic Liquid Oxygen (PTLOX) system or compressed oxygen cylinder.

14.2.5. Integral patient/passenger emergency oxygen is not available on the aircraft. In the event of an emergency, patients and passengers will use the EPOS.

14.2.6. AE Aircrew members will bring their own PBEs as portable oxygen. **(T-3)**

14.2.7. Do not secure aircraft or medical equipment in a manner that will prevent normal or emergency egress.

14.2.8. Life Preservers. Use the adult/child life preserver for litter patients.

14.3. Passengers and Cargo. The PIC, with the concurrence of the MCD, ensures maximum aircraft utilization for passengers and cargo. Passenger restrictions based upon patient considerations will be identified when seats are released. The PIC will advise the appropriate C2 agency of the number seats available for passengers IAW **paragraph 6.4**.

14.4. Patient Death In-Flight. If a suspected death of a patient occurs in-flight, the planned itinerary will not be interrupted if the next scheduled stop is a US military airfield. If the next stop is a civilian airfield that does not service a US military medical facility, or a foreign military airfield, that stop will be overflown (mission requirements allowing). Coordination with C2 is essential.

14.5. Spectrum 500-LP (Military Version) Model 2500 US. The Spectrum 500 LP is the current unit approved for use on C-21 AE missions. The litter system has self-contained oxygen, vacuum, compressed air, electrical power, and an overhead light. This unit plugs directly into aircraft power. The Spectrum is normally installed on the right side of the aircraft with the closet removed.

14.5.1. Standard Unit Base Weight: 150 lbs.

14.5.2. Power Required: 28 VDC aircraft electrical power (45.5 amps).

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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

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Abbreviations and Acronyms

AC—Aircraft Commander

AE—Aeromedical Evacuation

AFMAN—Air Force Manual

AGL—Above Ground Level

AMC—Air Mobility Command

ASRR—Airfield Suitability and Restrictions Report

ATC—Air Traffic Control

C2—Command and Control

CFP—Computer Flight Plan

DDA—Derived Decision Altitude

DME—Distance Measuring Equipment

EFB—Electronic Flight Bag

EP—Evaluator Pilot

ERO—Engine Running On/Offload

ETA—Estimated Time of Arrival

ETP—Equal Time Point

FCF—Functional Check Flight

FDP—Flight Duty Period

FMS—Flight Management System

FOD—Foreign Object Damage

FP—First Pilot

GDSS—Global Decision Support System

GPS—Global Positioning System

HF—High Frequency

IAW—In Accordance With

ICAO—International Civil Aviation Organization

IFM—Integrated Flight Management

ILS—Instrument Landing System

IMC—Instrument Meteorological Condition

IP—Instructor Pilot

JOSAC—Joint Operational Support Airlift Center

LNAV—Lateral Navigation

MCD—Medical Crew Director

MDA—Minimum Descent Altitude

MEL—Minimum Equipment List

MICAP—Mission Impaired Capability Awaiting Parts

MOB—Main Operating Base

NDB—Non-Directional Beacon

NM—Nautical Mile

NOTAMs—Notice to Airmen

OME—Operational Mission Evaluation

PF—Pilot Flying

PIC—Pilot in Command

PM—Pilot Monitoring

RCR—Runway Condition Reading

RNAV—Area Navigation

RNP—Required Navigation Performance

RRFL—Required Ramp Fuel Load

RSC—Runway Surface Condition

RVSM—Reduced Vertical Separation Minimums

RwyCC—Runway Condition Code

SID—Standard Instrument Departure

SM—Statute Mile

STAR—Standard Arrival Route

TCAS—Traffic Collision Avoidance System

TOLD—Takeoff and Landing Data

VMC—Visual Meteorological Conditions

VHF—Very High Frequency

VNAV—Vertical Navigation

Office Symbols

AMC/A3V—Air Mobility Command – Standardization and Evaluation

AMC/A3VS—Air Mobility Command – Standardization and Evaluation – Executive Airlift Branch

HAF/A3M—AF Special Air Mission Office

Terms

Advanced Computer Flight Plan/Mobility Air Forces Automated Flight Planning Service (ACFP/MAFPS)—An Air Force level system which is the follow-on replacement for the Optimized AMC Flight Plan (formerly Jeppesen). The system brings an improved user interface to the customer, runs in Microsoft Windows®, and communicates with a mainframe located at Scott AFB, Illinois. Once the optimized flight plans are produced on the mainframe, they are transmitted back to the user's PC.

Aeromedical Evacuation (AE)—Movement of patients under medical supervision between medical treatment facilities (MTFs) by air transportation.

Aeromedical Evacuation Crew Member—Qualified Flight Nurse (FN) and Aeromedical Evacuation Technician performing AE crew duties.

HAF/A3M (Air Force Special Air Mission Office)—Agency within the office of HAF/A3 responsible for scheduling and committing all Air Force airlift requirements to support the White House or any other executive branch of the government. This office is the single coordinating agent for the SAM/CSM/DVG aircraft fleet and schedules SAM/CSM.

Airfield Suitability and Restrictions Report—The ASRR is a MAJCOM mission planning document that provides detailed suitability technical data and policy for AMC and AMC-gained C-5, C-17, C-21, C-32, C-37, C-40, C-130, KC-10, KC-46, and KC-135 aircraft operations at airfields worldwide. GDSS Airfield Detail (Giant Report) provides the most up to date airfield suitability information.

Air Mobility Division (AMD)—One of five divisions of the AOC, the AMD integrates and supports air mobility missions. They coordinate with the JFC, theater AMOCC (if established) and 618 AOC (TACC) in planning, tasking, and executing theater air mobility missions.

Area Navigation-5 (RNAV-5)—Systems permitting aircraft navigation along any desired flight path within the coverage of ground or space-based navigation aids (NAVAIDS) or within the limits of the capability of self-contained aids or a combination of both methods. Although RNAV-5 specification does not include requirements for on-board performance monitoring and alerting, it does require that the on-board equipment keeps a lateral and longitudinal navigation accuracy on route of + 5 NM or better during 95% of the total flight time.

Critical Phase of Flight—Terminal area operations including taxi, takeoff and landing, low-level flight, formation operations, and all portions of any test or functional check flight or any aerial demonstration.

Command and Control (C2)—The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. C2 functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission.

Command and Control Center—Each C2 Agency provides supervision, guidance, and control within its assigned area of responsibility. For the purpose of this AFMAN, C2 Agencies include operations centers, command posts, air mobility elements, tanker airlift control elements (TALCE), air mobility control centers, and tanker task forces.

Contingency Fuel—Identified extra to compensate for unforeseen circumstances during any phase of flight (i.e., un-forecasted weather, launch delay, etc.).

Contingency Mission—Mission operated in direct support of an OPORD, OPLAN, disaster, or emergency.

Direct Supervision—Supervision by an instructor of like specialty with immediate access to controls (for pilots, the instructor must occupy either the pilot or copilot seat).

Director, Mobility Forces (DIRMOBFOR)—COMAFFOR's and/or JFACC's designated coordinating authority for air mobility with all commands and agencies internal and external to the joint force. The DIRMOBFOR is normally a senior officer with an extensive background in air mobility operations and is familiar with the area of responsibility (AOR). The DIRMOBFOR provides mobility direction and guidance to the Air Mobility Division in the theater air and space operations center (AOC).

Distinguished Visitor (DV)—Passengers, including those of friendly nations, of 0-6 rank or equivalent status (or above), to include diplomats, cabinet members, members of Congress, and other individuals designated by the DoD due to their mission or position.

Equal Time Point—Point along a route at which an aircraft may either proceed to destination or first suitable airport or return to departure base or last suitable airport in the same amount of time based on all engines operating.

Execution—Command−level approval for initiation of a mission or portion thereof after due consideration of all pertinent factors. Execution authority is restricted to designated command authority.

Fuel Reserve—Amount of usable fuel that must be carried beyond that required to complete the flight as planned.

Global Decision Support System—AMC's primary execution C2 system. GDSS is used to manage the execution of AMC airlift and tanker missions.

Global Positioning System (GPS)—A U.S. space-based positioning, velocity, and time system composed of space, control, and user elements. The space element nominally is composed of 24 satellites in six orbital planes. The control element consists of five monitor stations, three ground antennas and a master control station. The user element consists of antennas and receiver processors that provide positioning, velocity, and precise timing to the user.

Ground Time—Interval between engine shut down (or arrival in the blocks if engine shutdown is not scheduled) and next takeoff time.

Hazardous Cargo or Materials—Articles or substances that are capable of posing significant risk to health, safety, or property when transported by air and classified as explosive (class 1), compressed gas (class 2), flammable liquid (class 3), flammable solid (class 4), oxidizer and organic peroxide (class 5), poison and infectious substances (class 6), radioactive material (class 7), corrosive material (class 8), or miscellaneous dangerous goods (class 9). Classes may be subdivided into divisions to further identify hazard, i.e., 1.1, 2.3, 6.1, etc.

Home Station Departure—For the purposes of **Chapter 4** of this manual, home station departure refers to a flight duty period which begins at the unit’s home base and is planned to terminate at another location.

Joint Operational Support Airlift Center (JOSAC)—The single manager for scheduling all DoD CONUS Operational Support Airlift (OSA) requirements. As part of USTRANSCOM's Operations and Logistics (J3) directorate, JOSAC performs consolidated scheduling of CONUS OSA aircraft. During peacetime, OSA missions provide support to DoD command, installation, and management functions while improving readiness and providing cost-effective training of aircrews. Wartime OSA missions move high priority passengers and cargo in direct support of combat or contingency operations.

Letter of X—AMC unit certification document populated by signed AF Form 4324s. Replaces use of AF Forms 381/4348 IAW AFMAN 11-202V2_AMCSup.

Local Training Mission—A mission scheduled to originate and terminate at home station (or an off−station training mission), generated for training or evaluation, and executed at the local level.

Medical Crew Director (MCD)—FN responsible for supervising patient care and AE Aircrew members assigned to AE missions. On missions where a FN is not onboard, the senior AET will function as MCD.

Mission Execution Authority—The authority to direct where and when a mission goes and what it does once it arrives.

Mobility Air Force—Forces assigned to mobility aircraft or MAJCOMs with operational or tactical control of mobility aircraft.

Operational/Operationally Necessary—All missions that are not designated as training specific missions are considered “operational” or “operationally necessary”. All HAF/A3M, 618 AOC, and 603 AOC-tasked missions are considered operational/operationally necessary. A training mission will be considered operational/operationally necessary if external users are scheduled as part of the mission.

Operational Risk Management—A logic−based, common-sense approach to making calculated decisions on human, materiel, and environmental factors before, during, and after Air Force operations. It enables commanders, functional managers and supervisors to maximize operational capabilities while minimizing risks by applying a simple, systematic process appropriate for all personnel and Air Force functions.

Operational Support Airlift (OSA)—Movement of high priority passengers and cargo with time, place, or mission sensitive requirements.

Positioning and De-positioning Legs—Positioning legs are performed to relocate aircraft for the purpose of conducting a mission. De-positioning legs are made to return aircraft from bases at which missions have terminated.

Red X—A symbol that indicates that the aerospace vehicle, equipment, or system equipment is considered unsafe or unserviceable and will not be flown or used until the unsatisfactory condition is corrected and/or the symbol is cleared. Refer to T.O. 00-20-1, *Aerospace Equipment Maintenance Inspection, Documentation, Policies, and Procedures*, for more information.

Required Ramp Fuel Load (RRFL)—Minimum fuel required at engine start to complete the mission.

Show Time—The time at which aircrew members are expected to report for official duties.

Significant Meteorological Information (SIGMET)—Area weather advisory issued by an ICAO meteorological office relayed to and broadcast by the applicable ATC agency. SIGMET advisories are issued for tornadoes, lines of thunderstorms, embedded thunderstorms, large hail, severe and extreme turbulence, severe icing, and widespread dust or sandstorms. SIGMETs frequently cover a large geographical area and vertical thickness. They are prepared for general aviation and may not consider aircraft type or capability.

Tanker Airlift Control Center (618 AOC (TACC))—Operations center that controls tanker and airlift forces worldwide through a network of computer systems. The 618 AOC (TACC) is organized into geographic cells consisting of East, West, and Emergency Action Cells. The 618 AOC (TACC) contains the following functions: Mobility Management, Global Channel Operations, Operations Management, Current Operations, Global Readiness, Weather, Logistics Readiness Center, Aerial Port Control Center, International Clearances, and Flight Plans.

Tankering—Additional fuel carried through a primary destination for use on a subsequent leg.

Training Mission—Mission executed at the unit level for the sole purpose of aircrew training for upgrade or proficiency. Does not include operational missions as defined in this AFMAN.

Attachment 2

DEBRIEF GUIDE

Table A2.1. DEBRIEF GUIDE.

I. Mission Overview: a. Purpose (Operational Mission, Training, Evaluation) b. Objectives
II. Sortie Overview: See **Note** below, review appropriate items for each phase of flight. a. Predeparture Planning, Briefing, Paperwork b. Departure c. Enroute d. Arrival/Landing e. Termination
III. Training Review (If Required): a. Training Objectives b. Additional Training Requirements c. Student Critique, Evaluation Debrief
IV. After Action: a. Events/Issues warranting ASAP input or other safety forms b. Paperwork (training folder, MAR/GTIMS) c. Crew Rest Requirements/Legal for Alert Time d. Leadership Debrief (If Required): i. Formal Training Mission ii. Flight Evaluation Debrief iii. Sub-Standard Aircrew Performance
Note: Review all CRM and Threat/Error Management (TEM) items in each Phase of Flight:
- Situational Awareness
- Crew Coordination and Verbalize/Verify/Monitor Adherence
- External Communication
- Task Management
- Threat Recognition/Management/Corrective Measures
- Error Recognition/Management/Corrective Measures
- Flight Integrity, Wingman Consideration
- Safety Considerations
- Successful/Unsuccessful – Root Cause of Success/Failure