

**BY ORDER OF THE
SECRETARY OF THE AIR FORCE**

**AIR FORCE MANUAL 11-2C-130H,
Volume 3, Addenda-D**



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Flying Operations

LC-130 SKI PROCEDURES

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This addendum implements Air Force Policy Directive (AFPD) 11-2, *Aircrew Operations*, and supports Air Force Manual (AFMAN) 11-2C-130 Volume 3, *C-130 Operations Procedures*; AFI 11-200, *Aircrew Training, Standardization/Evaluation, and General Operations Structure*, AFMAN 11-202 Volume 3, *Flight Operations* and Department of the Air Force Manual (DAFMAN) 13-217 *Drop Zone, Landing Zone, and Helicopter Landing Zone Operations*. This addendum also implements requirements found in DoDD 5101.16E, *DoD Executive Agent (EA) for Support to the National Science Foundation (NSF) Office of Polar Programs (OPP)*. It establishes policy for the LC-130 unit to safely and successfully accomplish the worldwide ski missions. This addendum only applies to the Air National Guard. This manual may be supplemented at any level, but all supplements that directly implement this manual must be routed to the Office of Primary Responsibility (OPR) for coordination prior to certification and approval. 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/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 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. Ensure all records generated as a result of processes prescribed in this publication adhere to Air Force Instruction 33-322, *Records Management and Information Governance Program*, and

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SUMMARY OF CHANGES

This document has been substantially revised and must be completely reviewed. Major changes include: assisted takeoff (ATO) bottles and/or igniters carried inside the aircraft will be manifested in accordance with AFMAN 24-605, *Preparing Hazardous Materials for Military Air Shipments*. theater operations annex may direct LC-130 aircrews to subtract the sum of reserve fuel (Block 2) and alternate fuel (Block 4) when calculating depressurization fuel requirements; ski airborne radar approaches (ARA) approach procedures; and updates to the polar mobility PPE (Red Bag) in [attachment 2](#).

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Chapter 1

GENERAL INFORMATION

1.1. Sound Judgement. These procedures provide guidance to plan and execute LC-130 ski operations in polar environments. Instructions in this AFMAN are intended to provide the best possible operating procedures across a wide range of circumstances but cannot account for every possible situation a crewmember may encounter during a ski mission. Planners and aircrew must use sound judgment and operational risk management to manage unique mission demands.

1.2. General. The LC-130 is a highly flexible, all-weather, multi-mission weapon system, providing the capability to operate from a wide range of non-standard landing surfaces.

1.2.1. AFMAN 11-2C-130HV3 Addenda D Annex A consists of LC-130 specialized briefings and checklists. This annex is locally published and reviewed by National Guard Bureau Flying Training Branch (NGB/A3M).

1.2.2. *AFMAN 11-2C-130HV3 Addenda D Annexes B & C* detail LC-130 theater operations; Annex B (Antarctic Operations) and Annex C (Arctic Operations). Throughout this document these annexes are referred to as theater annexes. These annexes are locally published and reviewed by NGB/A3M.

1.2.3. AFMAN 11-2C-130HV3 Addenda D Annex D details LC-130 Deep Field Mission Planning and Execution. This annex is locally published and reviewed by NGB/A3M.

1.3. Deviations and Waivers. Document waivers to this addenda (and theater supplements/annexes) using DAF Form 679, *Air Force Publication Compliance Item Waiver Request/Approval*, and in accordance with Stan/Eval procedures published in theater addenda.

1.4. Roles and Responsibilities.

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

1.4.2. 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 publication and the following:

1.4.2.1. Headquarters Air Force, MAJCOM, and mission design series-specific guidance.

1.4.2.2. Flight information publications and foreign clearance guide.

1.4.2.3. Air traffic control clearances.

1.4.2.4. Notices to airmen (NOTAMs).

1.4.2.5. Aircraft technical orders (TOs).

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

Chapter 2

COMMAND AND CONTROL

2.1. Command and Control (C2). Refer to applicable theater annexes and applicable theater Operations Orders (OPORD's) for specific C2 requirements.

2.2. Search and Rescue (SAR) Requirements.

2.2.1. Due to the increased risks associated with LC-130 operations, a SAR aircraft is required for operations to any site without manned ground support. **(T-2)** Manned ground support will include weather reporting, food, shelter, first aid and communication capabilities. **(T-2)**

2.2.2. Applicable C2 will determine if an in-theater aircraft other than a fully mission capable LC-130 is suitable. **(T-3)** Consideration will be given to response time, carrying capacity and landing capabilities. **(T-3)**

2.3. Hostile Environment Kit Use. Use of the hostile environment kit requires C2 authorization. If the Pilot In Command (PIC) is unable to communicate with C2, approval authority is delegated to the PIC. **(T-2)**

2.4. Crew/Flight Duty and Crew Rest Limitations. Comply with AFMAN 11-202V3_AMCSUP, *Flight Operations*, and AFMAN 11-2C-130HV3 guidance. **(T-2)**

2.4.1. All Ski Mission events are restricted to the first 16 hours of Flight Duty Period (FDP) (e.g., Ski landings, Ski takeoffs, Ski Airborne Radar Approaches). **(T-3)**

2.4.2. Open Snow, reconnaissance, and polar airdrop operations are restricted to the first 12 hours of FDP. **(T-3)**

2.5. Personal Requirements. Refer to [Attachment 2](#) and applicable theater annex.

Chapter 3

PRE-FLIGHT / GROUND OPERATIONS

3.1. Polar Landing Zones (PLZ).

3.1.1. Ski Airfields. Ski airfields are groomed, skis only, landing zones, marked (flagged) as either Skiways or Ski Landing Areas (SLA) IAW DAFMAN 13-217. Non-standard markings may be used with C2 concurrence.

3.1.2. Open Snow. Open snow areas are generally unprepared, skis only, open-field landing areas with limited or no markings. Open snow areas include snow fields, glaciers and floating ice sheets. Due to lack of surface preparation and airfield markings, open snow operations present unique risk elements that must be mitigated.

3.1.3. Ice Runways. Ice runways, prepared for wheeled operations, may be constructed on compacted snow, glacial ice or floating ice sheets. Ice runways should be marked in the same manner as ski airfields.

3.1.4. Mission Folders. 109 Operations Support Squadron/Operations Support Weapons and Tactics will provide C2 and aircrews detailed mission execution folders for all Polar Landing Zones. **(T-3)** Folders will identify Risk Management (RM) considerations, safe areas for landing, known or potential crevasse areas as well as other hazards. **(T-3)** Mission Folders may be provided in hardcopy (paper) and/or a digital format (EFB). Reference AFMAN 11-2C-130HV3 Addendum D Annex D for additional information.

3.2. Maximum Aircraft Gross Weight. Maximum gross weights for aircraft operations at specific polar landing zones are established by C2 and will be disseminated by Notice to Airmen (NOTAM) or Read File. **(T-3)** Following operations at a given site, the PIC should forward recommendations for increase or decrease in maximum aircraft gross weight to C2. Duty Desk Officer and PIC will ensure RM sheets reflect the increased risk of operations at higher gross weights. **(T-3) Note:** Consideration to potential changes to landing zone conditions should be reviewed prior to each mission.

3.2.1. For operations at ski airfields, the initial maximum aircraft gross weight is 125,000 lbs. C2 may authorize a higher initial aircraft gross weight after evaluation of surface conditions.

3.2.1.1. Ski operations at aircraft gross weights above 135,000 lbs. will only be approved after LC-130 ground evaluation of the prepared surface. **(T-3)** Exceptions to this will be identified by pre-season analysis and annotated in theater annex. **(T-3)**

3.2.2. Open snow ski operations are normally limited to a maximum aircraft gross weight of 118,000 lbs. to 125,000 lbs. based on surface conditions.

3.2.2.1. Ski operations up to aircraft maximum gross weight limits specified in TO 1C-130(L)H-1 will only be considered on a case-by-case basis after LC-130 ground evaluation, RM and C2 approval. **(T-3)**

3.2.3. For ice runways, maximum aircraft gross weight will be 155,000 lbs. **(T-1)** The maximum aircraft gross weight is dependent on numerous variables such as ice thickness, temperature, surface conditions and supporting substructure. Refer to DAFMAN 13-217,

applicable Engineering Technical Letters, and Ski Landing Area Control Officer documentation. Consider aircrew analysis of conditions when available.

3.3. Cargo Loading and Offload Procedures. Operations on skis in remote areas without Material Handling Equipment (MHE) require the use of special on/offloading procedures and ski combat offload procedures. Permanent stations usually have a prepared cargo loading area and MHE allowing normal procedures to be used. The following restrictions apply to all polar cargo operations:

3.3.1. Normally, engines should remain running for all on/offloads at other than staging locations. However, the PIC may shut down engines at established sites when deemed necessary for mission accomplishment, provided the Auxiliary Power Unit (APU) is running before shutdown and remains running. **(T-3)** Engine shutdown during extreme cold weather operations should be avoided.

3.3.2. During open snow operations, all cargo restraints (chains, straps) will be left in place until the aircraft has come to a stop at the offload area and clearance to offload has been received from the PIC; this is to prevent the possibility of a load breaking loose while taxiing. **(T-3) Exception:** Ski Combat Offload

3.3.3. Ski Combat Offload.

3.3.3.1. The ski combat offload procedure provides a means of offloading single, multiple, married pallets, and Container Delivery System containers without the use of MHE when operating on skis. Refer to AFMAN 11-2C-130HV3 for limitations.

3.3.3.2. At out camps, the PIC is authorized to use ski combat offload procedures when deemed necessary for mission accomplishment. When carrying sensitive cargo, user concurrence must be obtained. **(T-3)** At permanent sites, the PIC will coordinate their intention to combat offload with the applicable C2. **(T-3)**

3.3.4. Transport of Ice Cores (Cold-Deck Operations).

3.3.4.1. Extreme care should be taken to ensure samples are transported within shipper defined parameters to the maximum extent possible. The viability of samples can be destroyed even at temperatures below freezing. Refer to Theater Operations Annex for specific procedures.

3.3.4.2. Passengers will not be carried on flights with ice cores requiring cold deck procedures. **(T-3)**

3.4. Remote Fueling and Concurrent Servicing Operations. Remote fueling is the transfer of fuel to or from an aircraft or ground storage system. Concurrent servicing is the simultaneous servicing of fuel with either passengers on board, the performance of minor maintenance, fleet servicing, or cargo on/offloading.

3.4.1. Engines are normally left running due to the remote environment and lack of support.

3.4.2. Remote fueling and concurrent servicing operations will be completed in accordance with AFMAN 11-2C-130HV3, TO 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*. **(T-2)** Refer to 109 AW/139 AS Remote Fueling Operations Training Guide for further guidance.

3.5. Assisted Takeoff (ATO) Procedures. C2 will determine the need for ATO based on environmental conditions and mission requirements. **(T-3)** C2 will pre-coordinate ATO requirements with maintenance. **(T-3)** The aircraft will be parked on a designated ATO loading area or “hot spot” at the staging base for ATO mounting. **(T-3)**

3.5.1. ATO bottles will be mounted on the aircraft prior to departure, unless waived by C2. Multiple sorties with ATO bottles mounted are permitted. **(T-3)**

3.5.2. ATO bottles and/or igniters carried inside the aircraft will be considered cargo and manifested in accordance with AFMAN 24-604. **(T-2)** If ATO bottles are mounted on the aircraft, igniters do not need to be manifested as they are considered aircraft components.

3.5.2.1. The local fire department should be notified any time ATO will be mounted on the aircraft.

3.5.2.2. 109 AW will outline ATO operations and procedures in an appropriate Wing-level instruction or supplement to AFMAN 11-202V3, *Flight Operations*.

3.6. Extreme Cold Weather Procedures. The LC-130 will not be operated in temperatures below its operational cold weather restriction (minus 50° C). **(T-3)** Aircrews will use the station’s reported temperature; wind chill does not affect aircraft operating limitations. **(T-3)** Waivers to operate at temperatures colder than –50°C (-58°F) will only be considered for emergencies such as medical evacuation. These missions require additional planning, risk assessment and C2 approval. **Note:** The temperature restriction is based on mission history, maintenance considerations, and performance limitations of AN-8 fuel and MIL-PRF-87257 hydraulic fluid (Ref: TO1C-130(L)H-1).

3.6.1. Aircrew will not on/offload cargo that requires MHE when surface contrails exist and obscure the visibility of the loading crew. **(T-3)**

3.6.2. When temperatures are at or below -45° C, C2 will factor surface obscuration in mission planning prior to scheduling a mission requiring MHE. **(T-2)** If a mission is released under these circumstances, the PIC and Loadmaster will assess current conditions at the location to ensure necessary visibility for safe operations. **(T-1)**

3.6.3. Before utilizing Low Speed Ground Idle or before warming the aircraft during extended stays/shutdowns at remote camps refer to the Flight Engineer, *Extreme Cold Weather Procedures/Techniques* section.

3.7. Depressurization Fuel. The Theater Operations Annex may direct LC-130 aircrews to subtract the sum of reserve fuel (Block 2, Ref AF Form 4116) and alternate fuel (Block 4, Ref AF4116) when calculating depressurization fuel requirements.

Chapter 4

FLIGHT OPERATIONS

4.1. Taxi, Takeoff and Departure Restrictions.

4.1.1. General. Refer to AFMAN 11-2C-130HV3 and theater annex for additional guidance.

4.1.2. Taxi Operations.

4.1.2.1. Crews should be cognizant of the combined effects of gross weight (GW), wind, and runway condition reading (RCR) to both wheel and ski taxi operations. For wheeled operations TO 1C-130(L)H-1 states the LC-130 is capable of taxiing in a 30 kt, 90 degree wind with the use of nose-wheel steering and rudder. These numbers are based on favorable GW and RCR conditions. Lower GWs and RCRs are less favorable variables. Because the hazardous combination of wind, GW and RCR is difficult to judge, crews must thoroughly analyze current conditions to determine if it is safe to taxi the aircraft on wheels or skis. **(T-3)**

4.1.2.2. Aircraft with gross weights of 135,000 lbs. or greater will taxi on prepared (groomed) surfaces to the maximum extent possible. **(T-3)** Comply with TO 1C-130(L)H-1 taxi restrictions.

4.1.3. Wind Restrictions. Ski takeoffs are prohibited when the surface wind (including gusts) exceeds 35 knots or the crosswind component exceeds 15 knots. **(T-2)**

4.1.4. Ski takeoffs will be conducted by a ski mission qualified Aircraft Commander (AC) in the left seat or a ski mission qualified instructor pilot in either seat. **(T-3)** **Exception:** See [Chapter 6](#).

4.1.5. Night ski takeoffs require 109th Airlift Wing Commander (AW/CC) approval.

4.1.6. ACs will not depart a staging base to a remote polar site without an operational #1 (pilot's) radar altimeter and APN-241 radar. **(T-3)**

4.1.7. On departure, the navigator will call passing 50, 100, 200, 300 and 400 feet above ground level (AGL), or as briefed by the Pilot Flying (PF). **(T-3)**

4.1.8. Perform a detailed terrain study and review of engine out climb performance. If an approved instrument flight rules (IFR) departure procedure is not available, ACs will ensure ability to climb in visual meteorological conditions (VMC) until reaching the applicable minimum IFR altitude (MIA) (i.e., base of restricted operating zone (ROZ), instrument meteorological conditions (IMC) letdown corridor or enroute MIA). **(T-2)**

4.1.9. For departure weather minima and visual flight rules (VFR)/IFR departure restrictions, reference [paragraph 5.1](#).

4.2. Enroute Operations.

4.2.1. Utilize published airways or theater approved area navigation (RNAV) routing to the maximum extent possible.

4.2.2. To utilize unpublished routing, accomplish a thorough route study prior to departure to ensure safe terrain clearance.

4.2.3. When using unpublished IFR routing, calculate an enroute MIA that will provide 3,000 feet of terrain clearance within 22 nautical miles of center line. **(T-3)**

4.2.4. Do not operate below 500 feet AGL unless required for mission accomplishment.

4.2.5. All published courses and headings are polar grid, unless otherwise noted; self contained navigation system (SCNS) convergence factor should be verified by another pilot/navigator.

4.2.6. Point of Safe Return (PSR). The PSR calculation determines the commit point beyond which return to the point of departure (or a suitable alternate) with the required overhead (or divert) fuel is no longer an option. Due to the austere nature of polar operations, aircrew will consider their alternate/divert options and determine a PSR when mission requirements dictate. **(T-3)** At a minimum PSR will be computed whenever an equal time point is required. See [Figure 4.1](#) for PSR calculations. **(T-3) Note:** Amend PSR when destination weather requires an alternate IAW AFMAN 11-202V3.

Figure 4.1. Point of Safe Return (PSR) Formulas.

$$\text{PSR} = \frac{(\text{GS}_{(\text{Return})}) * \left(\frac{1}{2} \text{ Time}\right)}{\text{TAS}}$$

$$\frac{1}{2} \text{ Time} = \frac{\text{Takeoff Fuel} - \text{Overhead Fuel}_{(\text{Divert})}}{2 (\text{Average Fuel Flow})}$$

*Overhead Fuel*_(Divert) = (Reserve + Alternate + Approach + Landing Fuel)

TAS – Planned True Airspeed (Long Range Cruise, usually 270 knots indicated airspeed)

GS_(Return)– Planned Ground Speed return (usually TAS plus the inverse of WF1)

$\frac{1}{2}$ Time – Half the amount of fuel available, converted to time, to take off from the departure point, fly to some point, and return to the planned return airfield with the required overhead fuel remaining. In the no-wind situation $\frac{1}{2}$ Time equals PSR Time.

PSR – Estimated Time En-route (ETE) to a point where a safe return is assured.

4.3. Descent and Arrival.

4.3.1. Prior to descent, the AC will confirm site coordinates and theater approved RNAV routing is properly entered into SCNS and independently verified by another pilot or navigator. **(T-3)**

4.3.2. Prior to descent, the crew will attempt to establish two-way communications with the site to obtain current weather conditions and traffic information. **(T-3)** See [paragraph 5.1](#).

Note: If weather reporting capability is not available, the PIC is the final authority on determining if conditions are suitable for safe descent and landing.

4.3.3. Crews will set the lowest forecast altimeter setting prior to descent through transition level when local altimeter setting is unavailable or unreliable. **(T-3)**

4.3.4. Temperature extremes may require corrections to minimum altitudes. Cold weather temperature corrections will be applied in accordance with AFMAN 11-202V3 and the Flight Information Handbook (FIH). **(T-2)**

4.3.5. Crews will avoid descent rates in excess of 1,000 Feet Per Minute, airspeed in excess of 230 knots indicated airspeed, and bank angles in excess of 30 degrees when within 3,000 feet AGL and either in IMC or over barren featureless terrain. **(T-2)**

4.3.5.1. Referencing the radar altimeter, the pilot monitoring (PM) will state passing “3,000 feet” AGL. **(T-3)**

4.3.5.2. Descending below 3,000 feet AGL, the aircrew should compare aircraft true altitude (ground elevation + radar altimeter) to indicated pressure altitude for indications of a gross error in local altimeter setting. If altimeter setting is in question, conduct a pressure altimeter update (Refer to [paragraph 4.4.7.](#)).

4.3.6. Descent below the enroute minimum IFR altitude in IMC is prohibited unless:

4.3.6.1. Descending via an IMC letdown procedure **(T-1)**

4.3.6.2. Established on a published instrument approach **(T-1)**

4.3.7. IMC Letdown Procedures. Landing Zones (LZs) without a published instrument approach may require a procedural IMC Letdown Corridor or use of a ROZ. These procedures allow for a safe IMC descent from the enroute MIA to attain VMC. IMC letdown procedures and associated MIAs will be developed by 109 OSS/OSK IAW AFTTP 3-3.C-130H, *Combat Aircraft Fundamentals C-130H*. **(T-3)**

4.3.7.1. IMC Letdown Corridor. An IMC letdown corridor allows an aircraft to operate safely below the minimum IFR enroute altitude.

4.3.7.1.1. All corridors constructed for polar operations will provide a minimum of 1,000 feet (2,000 feet in mountainous terrain) obstacle clearance within 5 Nautical Miles (NMs) of planned course. **(T-3)**

4.3.7.1.2. Corridors will include an Entry, Decision, Latest Climb, and Exit points. **(T-3)**

4.3.7.2. Restricted Operating Zone (ROZ). A ROZ is typically a cylindrical area of protected airspace which allows an aircraft to descend to an altitude not lower than ROZ minimum safe altitude (MSA). A ROZ will be placed for maximum utility and therefore, may not always be centered on a landing site or objective area (OA). **(T-3)**

4.3.7.2.1. Polar ROZs will provide a minimum of 1,000 feet (2,000 feet in mountainous terrain) obstacle clearance within 5NMs of the defined boundaries of the ROZ. **(T-3)**

4.3.7.3. Crews will utilize all available navigational aids (e.g., SCNS, low power color radar (LPCR) and moving map) to ensure adequate terrain and obstacle clearance. **(T-3)**

Crews will perform a thorough review of terrain and obstacles, weather and aircraft climb performance before commencing a descent below the enroute MIA. **(T-3)**

4.3.7.4. If use of an IMC letdown procedure does not allow the aircraft to attain and maintain VMC, the aircraft should remain within ROZ/letdown corridor protected airspace to climb back to the enroute MIA. **(T-2)**

4.3.7.5. An IMC letdown procedure can be used to position aircraft for an airborne radar approach (ARA).

4.3.7.6. 109 OSS/OSK will develop site specific, forecast weather minimums for use with IMC letdown procedures. **(T-3)** These minima will be considered prior to departure from the staging base. **(T-3)**

4.4. Approach.

4.4.1. If unable to contact ground personnel, all approaches (VFR and IFR) should be initiated over the landing threshold or open-snow coordinates. This allows the aircrew to verify coordinates, determine the altimeter setting, evaluate the weather conditions, alert site personnel and inspect the landing area prior to landing. All approaches will be flown not exceeding stabilized approach criteria. **(T-2)**

4.4.2. For approach weather minima see [paragraph 5.1](#).

4.4.3. A SCNS LZ should be programmed and briefed for all landings. Program SCNS to give distance remaining to the LZ threshold, target open snow coordinates or as otherwise briefed.

4.4.4. The PIC is responsible for maintaining separation of aircraft in uncontrolled airspace. The PIC will maintain a minimum 1,000 feet of vertical separation between aircraft until safe lateral separation is assured. **(T-3)**

4.4.4.1. Traffic advisory calls will be made over common traffic advisory frequency in uncontrolled airspace IAW AFMAN 11-202V3 and applicable theater annex. **(T-3)**

4.4.5. Prior to crossing the Intermediate Fix (IF), monitor radar altimeters for indications below 1,000 feet AGL. If in IMC and altimeter accuracy is in question, crews will perform a pressure altimeter update (PAU) and continue to monitor the radar altimeter to touchdown. **(T-3)**

4.4.6. Stabilized Approach Criteria. During all ski approaches, the aircraft must be stabilized on final approach and will be in the landing configuration before descending below 300 feet AGL. **(T-3)** An aircraft is considered stabilized on final approach when it is: (1) aligned with the extended centerline, (2) no more than 10 degrees of bank angle, (3) established on a normal glide path and (4) within 5 knots of approach speed. With the exception of momentary deviations, a go-around or missed approach will be accomplished any time the approach becomes unstable below 300 feet AGL. **(T-3)**

4.4.7. If the camp reported altimeter setting is not available, or accuracy is in question, perform a PAU before starting an ARA. The PAU procedure will allow the crew to determine a safe barometric altimeter setting. For additional information, reference AFTTP 3-3.C-130H, *Pressure Altimeter Update Using the Radar Altimeter* section.

4.4.7.1. PAU Procedure. The PAU is conducted over a checkpoint of known elevation, normally the threshold of a landing zone. Descend and pass over the PAU checkpoint, referencing the radar altimeter, at the radar altimeter check altitude (RACA) published on the ARA procedure. **Note:** Aircraft is normally at MSA for an altimeter update. Published RACA is the difference between aircraft mean sea level (MSL) altitude (MSA or as annotated) and ground elevation at a known checkpoint:

4.4.7.1.1. RACA (AGL) = aircraft crossing altitude MSL – checkpoint elevation

4.4.7.1.2. When over the PAU checkpoint, the pilot's barometric altimeter will be adjusted to the appropriate barometric altitude (normally MSA published on ARA plates). **(T-3)** The copilot and navigator will adjust their respective altimeter setting to match the pilot's. **(T-3)**

4.4.7.1.3. Once an updated altimeter setting has been determined, the barometric altimeter will be referenced as the primary altitude reference for the remainder of the approach. **(T-3)** The radar altimeter will continue to be crosschecked. **(T-3)**

4.4.7.1.4. After performing a PAU, crews will apply temperature correction to procedure altitudes IAW AFMAN 11-202V3 and the FIH. **(T-3)**

4.4.7.2. PAU is not required when:

4.4.7.2.1. Weather conditions meet or exceed a ceiling of 1,500 feet and a visibility of 3 statute miles (SM). **(T-3)**

4.4.7.2.2. C2 grants approval; such approval will be disseminated by NOTAM and /or Read File. **(T-3)**

4.4.7.2.3. A minimum of 2 consecutive LC-130 missions to the site confirming accurately reported altimeter settings are required prior to removing the PAU requirement for ARAs in IMC. **(T-3)** Sites not requiring a PAU for initial seasonal operations will be listed in the theater annex. **(T-3)** If inaccurate altimeter setting reports are identified at any time, C2 will suspend non- PAU arrivals to the site and update NOTAM and/or Read File as applicable. **(T-3)**

4.4.8. Ski Airborne Radar Approaches (ARA). Ski ARAs are instrument approach procedures designed, developed, and reviewed by MAJCOM terminal instrument procedures (TERPS) specialists, in coordination with 109 OSS/OSK. The responsible MAJCOM TERPS agency is dependent on operational theater and the mission supported.

4.4.8.1. The navigator will direct the ARA using aircraft radar as the primary means to position the aircraft. **(T-3)**

4.4.8.2. The navigator will direct aircraft heading and descent profile until the PM acquires visual references to safely guide the PF to the landing zone. **(T-3)** When there are sufficient ground references to take over the approach guidance, the PM will state "copilot (or pilot) has the approach". **(T-3)** The PM will then provide approach guidance to the PF and the navigator will provide drift and distance to the landing threshold while continuing to monitor the aircraft's ground track. **(T-3)** If the PM has not stated "copilot (or pilot) has the approach" by the MAP, the navigator will call "go around" and the PF will execute the published missed approach. **(T-3)**

4.4.8.3. The PM will observe three sets of lead-in or skiway flags and the approach must meet Stabilized Approach Criteria before stating “continue descent”. **(T-3)** The PF may then descend no lower than 100 feet AGL. **(T-3)** Before descending below 100 feet AGL, the PF will see the landing zone and state “pilot (or copilot) has the skiway (or ski landing area)”. **(T-3)** Transfer of aircraft control to the landing pilot will be made stating “pilot (or copilot) has the aircraft” prior to descending below 100 feet AGL. **(T-3)**

4.4.8.4. If the PF cannot acquire the landing zone or the aircraft is not in a safe position to land, the PF will execute a go around. **(T-2)** On climb-out, the navigator will call passing 50, 100, 200, 300 and 400 feet AGL, or as briefed by the PF. **(T-3)**

4.4.8.5. For weather minima reference [paragraph 5.1](#).

4.5. Landing Restrictions.

4.5.1. Navigator will call passing 300, 200, 100, 50, 40, 30, 20, and 10 feet AGL, or as briefed by the PF. **(T-3)**

4.5.2. Wind Restrictions. Ski landings are prohibited when the surface wind (including gusts) exceeds 35 knots or the crosswind component exceeds 15 knots. **(T-2)**

4.5.3. Ski landings will be conducted by a ski mission qualified aircraft commander in the left seat or a ski mission qualified instructor pilot in either seat. **(T-3)** **Exception:** See [Chapter 5](#).

4.5.4. Night ski landings require 109 AW/CC approval.

4.5.5. Practice or actual minimum run ski landings require 109 Operations Group Commander approval.

4.5.6. Anytime the aircraft is stopped after a ski landing, the flight engineer will visually inspect the skis. The PIC may waive this requirement.

4.5.7. For weather minima reference [paragraph 5.1](#).

4.6. Ski ARA Flyability Check and Airfield Marking (Skiway) Certification. In-Theater evaluation of a Ski ARA consists of a flyability check of the ARA procedure (when required) and a marking certification to confirm skiway marking is IAW DAFMAN 13-217.

4.6.1. Flyability Check. A flyability check will consist of a flight to verify that the approach provides suitable obstacle and terrain clearance, confirm procedure headings and alignment, review procedure complexity and evaluate flight deck workload. **(T-3)**

4.6.1.1. 109 OSS/OSK will identify procedures requiring flyability check as part of the planning process and will annotate this requirement on the *Pre- Season Site Analysis Checklist*. **(T-3)** Flyability check will be only accomplished for new ARA procedures where an Instrument Approach has not previously existed or in cases where the procedure has been significantly modified. **(T-3)**

4.6.1.2. Flyability Checks will be performed with weather at or above a ceiling of 1500 feet and visibility of 3 miles. **(T-3)** All segments of the procedure should be flown in VMC to the maximum extent possible.

4.6.1.3. Crews will evaluate the radar presentation and ensure that flagging, obstacles and terrain are clearly discernible. **(T-3)** Annotate clutter, camp layout and abnormalities.

Crews will document procedure compliance or discrepancies on *Skiway / SLA Marking Certification and ARA Flyability Check (T-3)*

4.6.2. Airfield Marking Certification. Airfield marking certification will ensure that each skiway complies with minimum flagging requirements IAW DAFMAN 13-217 and that flags are visible from the air, both visually and on radar. **(T-3)** Certification is independent for each skiway direction and will include a review of both lead-in flags and skiway flags for a given direction of flight. **(T-3)**

4.6.2.1. All seasonal skiways require an airfield marking certification unless otherwise identified in theater annex. **(T-3)**

4.6.2.2. Until skiway markings are certified, ARA weather minimums will be not less than 1000 feet and 3 miles. **(T-3)**

4.6.2.3. Surface grooming conditions should be noted, but are not required for certification. Grooming status will affect maximum aircraft gross weight restrictions only. See [paragraph 3.2](#).

4.6.2.4. When authorized by C2, certification of airfield markings IAW DAFMAN 13-217 may be performed by ground personnel.

4.6.2.5. Crews will document certification or discrepancies on *Skiway / SLA Marking Certification and ARA Flyability Check (T-3)*.

4.7. Emergency Landing Procedures. It may become necessary to execute an emergency landing or land in a non-surveyed area. Use all available resources to locate the most suitable site. Reference Annex A, and theater annex for additional guidance.

4.7.1. When in the vicinity of an established site, confer with ground personnel to determine a safe landing location that presents the fewest known ground hazards.

4.8. Airdrop Procedures (Polar Airdrop). The nature and operational restrictions inherent in polar airdrop environments impose a number of significant challenges not encountered in traditional airdrop employment. The use of austere, flexible drop zones, potential lack of DZ personnel, minimum weather services and poor terrain/obstacle data are some of the challenges. Extensive pre-mission OA planning, user coordination and potential collateral damage assessment is essential to mission success; reference AFTTP 3-3.C-130H, *Airdrop Methods and Techniques* section.

4.8.1. Ski ARA procedures combined with Mission Computer Airdrop techniques provide a stable platform and accurate means of positioning the aircraft. When no discernible ground features exist (e.g., camp, cache, vehicle or terrain feature) the box pattern may be omitted, and the airdrop conducted over fixed coordinates. See [Figure 4.2](#).

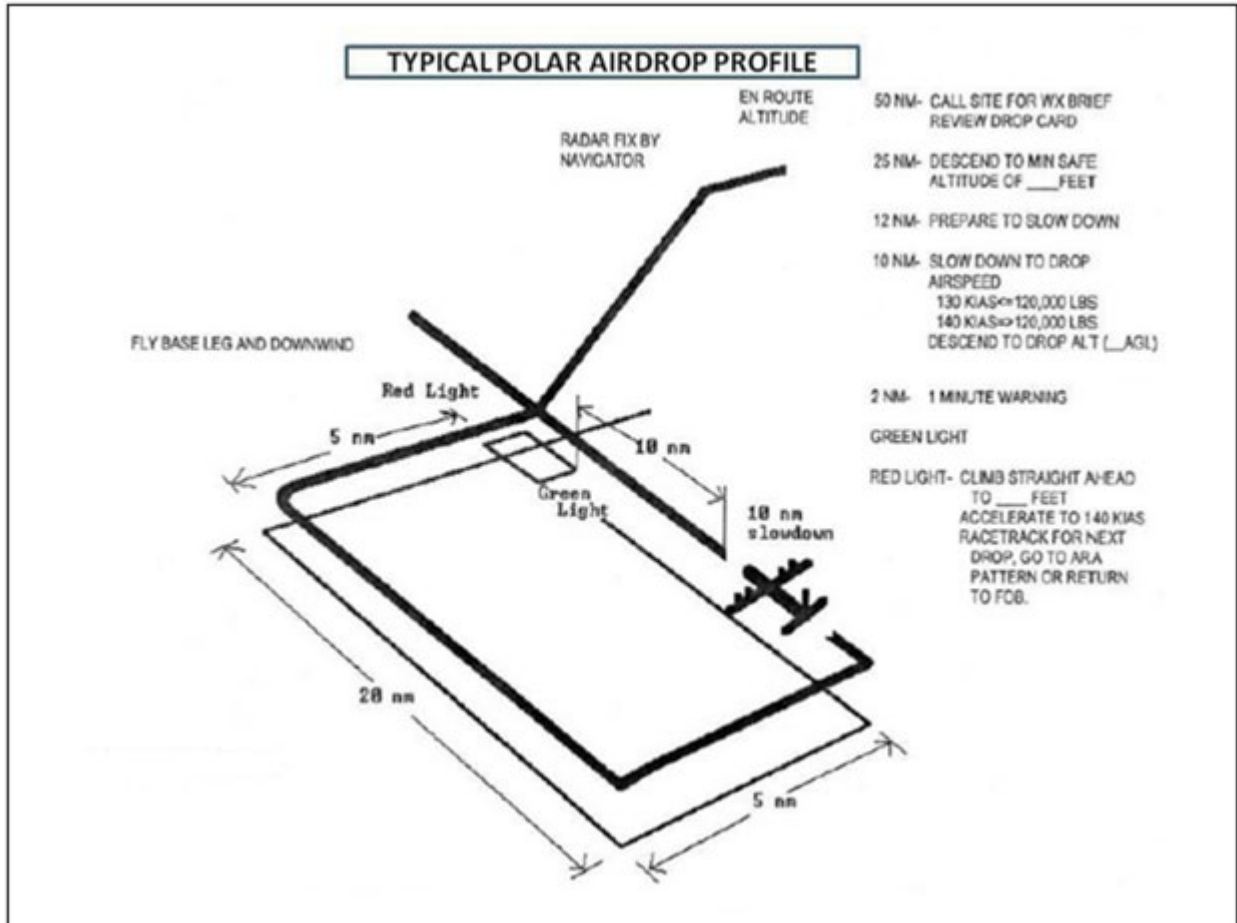
4.8.2. 109 OSS/OSK will provide aircrew with a mission folder for airdrop missions. **(T-3)** If a mission folder is not available, a thorough mission plan will be formulated prior to departure and approved by appropriate C2. **(T-3)**

4.8.3. For airdrops where cabin pressure altitude is expected to exceed 10,000 feet MSL, Medium/High Altitude qualified aircrews, procedures and equipment will be used. **(T-2)**

4.8.4. Minimum equipment for polar airdrop will include an operational APN-241 LPCR, SCNS and #1(pilot's) radar altimeter. **(T-3)**

4.8.5. C2 will determine requirement for additional crewmembers (i.e., extra navigator, loadmaster). (T-3)

Figure 4.2. Typical Polar Airdrop Profile.



Chapter 5

WEATHER

5.1. Weather Minima.

5.1.1. General. In addition to AFMAN 11-202V3 and AFMAN 11-2C-130HV3 restrictions, reference applicable theater annex for theater specific weather requirements. 109 OSS/OSK will set higher weather minimums when required for safety. **(T-3)** Changes to 109 OSS/OSK established weather minimums require C2 approval and will be published by NOTAM/Read File. **(T-3)**

5.1.2. Departure. Do not depart a Polar Landing Zone when visibility is less than ½ SM (800M); the PIC may use airfield flagging as an aid in determining visibility. **(T-1)** If departing a site with weather less than return approach minimums, a departure alternate is required. **(T-1)** When departing an open snow site, crews will ensure ability to climb in VMC until reaching the applicable MIA. **(T-1)**

5.1.2.1. VFR Departure. Maintain VMC and obtain an IFR clearance prior to entering controlled airspace. **(T-2)**

5.1.2.2. IFR Departure. Obtain IFR clearance prior to takeoff. If unable, the PIC may depart under IFR in Class G airspace in IMC; however, an approved IFR departure method is still required. **(T-2)** The PIC is responsible for maintaining traffic and terrain/obstruction clearance. Obtain an IFR clearance prior to entering controlled airspace. **(T-2)**

5.1.3. Descent. If not established on a segment of an IFR approach, do not descend below the applicable MIA (Enroute, ROZ, or Letdown Corridor) unless able to remain in VMC until landing. **(T-2)**

5.1.3.1. Due to visual limitations and illusions, descent below 1,000 feet AGL to a VMC only destination is not recommended unless the landing area is in sight. Surface/Horizon conditions should be considered prior to descent.

5.1.4. Approach & Landing.

5.1.4.1. MAJCOM approved ARA – As published; not less than 300 feet and 1 mile. **(T-1)**

5.1.4.2. IFR Visual Approach/VFR arrival – not less than 1500 feet and 3 miles. **(T-1)**

5.1.4.3. Open snow landings - VMC below the MIA and Surface/Horizon condition of Fair/Fair. **(T-1)**

5.2. Surface and Horizon Condition Definitions. Surface and horizon condition values are determined and reported by an observer on the surface or determined by the aircrew when no observer is present (i.e., initial put-in). They are intended for pilot advisory information and are not limiting, except where listed in other parts of this chapter.

5.2.1. Surface Definition Values.

5.2.1.1. Good: Snow features such as sastrugi, drifts and gullies are easily identified by shadow. The sun is usually un-obscured.

5.2.1.2. Fair: Snow surface features can be identified by contrast, but no definite shadows exist. The sun is usually partially to near totally obscured.

5.2.1.3. Poor: Snow surface features cannot be readily identified except from close up. The sun is usually totally obscured.

5.2.1.4. Nil: Snow surface features cannot be identified. No shadows or contrast exist. Dark objects appear to float in the air. Although the overcast may exhibit considerable glare, the sun is totally obscured. Due to surface reflection, the glare appears to be equally bright in all directions.

5.2.2. Horizon Definition Values.

5.2.2.1. Good: The horizon is sharply defined by sky and snow contrast.

5.2.2.2. Fair: The horizon may be identified although the contrast between sky and snow surface is not sharply defined.

5.2.2.3. Poor: The horizon is barely discernible.

5.2.2.4. Nil: Total loss of horizon definition. The snow and sky surfaces appear to merge.

Chapter 6

TRAINING RESTRICTIONS

6.1. Training Restrictions.

- 6.1.1. Practice no-flap ski landings are prohibited. **(T-3)**
- 6.1.2. Touch and Go ski landings are prohibited. If performing multiple ski takeoff and landings, crews may stay on the Touch and Go checklists. **(T-3)**
- 6.1.3. The following pilots are authorized to perform ski takeoffs and landings:
 - 6.1.3.1. Ski ACs from the right seat, under direct Instructor Pilot (IP) supervision. **(T-3)**
 - 6.1.3.2. Ski mission qualified copilot receiving Ski AC upgrade training in the left seat, under direct IP supervision. **(T-3)**
 - 6.1.3.3. Ski mission qualified copilot in the right seat, under direct IP supervision and the following conditions:
 - 6.1.3.3.1. Weather minimums: 1,500 feet 3 SMs (1500/3) or better. **(T-3)**
 - 6.1.3.3.2. Surface/Horizon definitions: Fair/Fair or better. **(T-3)**
 - 6.1.3.3.3. Maximum crosswind of 10 knots. **(T-3)**
 - 6.1.3.3.4. Skiway operations only; no open snow or SLA operations. **(T-3)**
- 6.1.4. Open Snow and White Out Landing Training. A surveyed open snow training area exists at Raven Camp in Greenland and at the McMurdo White-Out Area in Antarctica. Open snow and simulated white-out landing training at these (or other) locations require C2 approval. Refer to applicable theater annex for theater specific guidance. The following conditions must be met:
 - 6.1.4.1. Weather minimums: 1,500 feet and 3 SMs or better. **(T-3)**
 - 6.1.4.2. Surface/Horizon definitions: Fair/Fair or better. **(T-3)**
 - 6.1.4.3. Aircraft is not needed for maintenance and/or follow on event. **(T-3)**
 - 6.1.4.4. No passengers, sensitive cargo, or any cargo requiring immediate handling. **(T-3)**
 - 6.1.4.5. Maximum aircraft gross weight of 118,000 lbs., with fuel distribution IAW T.O. 1C-130(L)H-1 max-effort landing restrictions. **(T-3)**
 - 6.1.4.6. IP in either seat required for simulated White Out landing training; landings will be accomplished using outside visual references. **(T-3)**
- 6.1.5. Simulated engine failure training will follow this guidance:
 - 6.1.5.1. IP will be in either seat. **(T-3)**
 - 6.1.5.2. Weather minimums: 1,500 feet and 3 SMs or better. **(T-3)**
 - 6.1.5.3. Surface/Horizon definitions: Fair/Fair or better. **(T-3)**
 - 6.1.5.4. No passengers. **(T-2)**
 - 6.1.5.5. Maximum gross weight of 125,000 lbs. **(T-3)**

6.1.5.6. Ski airfield only. **(T-3)**

6.1.5.7. Simulated engine failure will be on the upwind side for landing. **(T-3)**

6.1.6. Practice Minimum Run Ski Landings requirements:

6.1.6.1. IP will be in either seat. **(T-3)**

6.1.6.2. Maximum gross weight will be 125,000 lbs. for ski airfields or 118,000 lbs. for open snow. **(T-3)**

6.1.6.3. Requires 109 OG/CC approval.

ADRIAN L. SPAIN, Lt Gen, USAF
Deputy Chief of Staff, Operations

Attachment 1**GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

TO 1C-130(L)H-1, *Flight Manual*, 25 December 2022

TO 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*, 12 July 2023

DAFMAN 13-217, *Drop Zone, Landing Zone, and Helicopter Landing Zone Operations*, 22 April 2021

AFMAN 11-202V3, *Flight Operations*, 10 January 2022

AFMAN 11-202V3_AMCSUP, *Flying Operations*, 14 June 2021

AFMAN 11-2C-130HV3, *C-130 Operations Procedures*, 5 December 2023

AFMAN 24-605, *Preparing Hazardous Materials for Military Air Shipments*, 9 October 2020

AFI 11-200, *Aircrew Training, Standardization/Evaluation, and General Operations Structure*, 3 May 2022

AFI 33-322, *Records Management and Information Governance Program*, 23 March 2020

AFTTP 3-3.C-130H, *Combat Fundamentals C-130H*, 23 October 2020

AFPD 11-2, *Aircrew Operations*, 31 January 2019

DAFMAN 90-161, *Publishing Processes and Procedures*, 18 October 2023

DoDD 5101.16E, *DOD Executive Agent (EA) for Support to the National Science Foundation (NSF) Office of Polar Programs (OPP)*, 7 February 2020

109 AW/139 AS Remote Fueling Operations Training Guide

Adopted Forms

AF Form 4116, *C-130 Navigator Flight Plan and Log*

DAF Form 847, *Recommendation for Change of Publication*

DAF Form 679

Abbreviations and Acronyms

AC—Aircraft Commander

AFMAN—Air Force Manual

AFTTP—Air Force Tactics, Techniques, and Procedures

AGL—Above Ground Level

ARA—Airborne Radar Approach

ATO—Assisted Takeoff

AW/CC—Airlift Wing Commander

C2—Command and Control
DAF—Department of Air Force
DAFMAN—Department of Air Force Manual
ECW—Extreme Cold Weather
EFB—Electronic Flight Bag
FIH—Flight Information Handbook
FDP—Flight Duty Period
GW—Gross Weight
IAW—In Accordance With
IFR—Instrument Flight Rules
IMC—Instrument Meteorological Conditions
IP—Instructor Pilot
LPCR—Low Power Color Radar
LZ—Landing Zone
MAJCOM—Major Command
MHE—Material Handling Equipment
MIA—Minimum IFR Altitude
MSA—Minimum Safe Altitude
MSL—Mean Sea Level
OA—Objective Area
NOTAM—Notice to Airmen
PAU—Pressure Altimeter Update
PF—Pilot Flying
PIC—Pilot in Command
PM—Pilot Monitoring
PPE—Personal Protective Equipment
PSR—Point of Safe Return
RACA—Radar Altimeter Check Altitude
RCR—Runway Condition Reading
RM—Risk Management
RNAV—Area Navigation
ROZ—Restricted Operating Zone

SAR—Search and Rescue
SCNS—Self Contained Navigation System
SLA—Ski Landing Area
SM—Statute Mile
TAS—True Airspeed
TERPS—Terminal Instrument Procedures
VMC—Visual Meteorological Conditions

Office Symbols

109 AW/CC
109 OG/CC
109 OSS/OSK
AF/A3T—Aircrew Tactics and Training Division
AMC/A3VX—Aircrew Standardization Evaluation Airlift Operations
NGB/A3M—National Guard Bureau Mobility Flying Training Branch

Terms

Flyability Check—An in-flight safety evaluation of a new ski ARA procedure.

Flagging—Flags used to define a ski airfield or ice runway per DAFMAN 13-217.

Grooming—Preparation of a ski airfield to improve smoothness.

Ice Runway—A wheeled landing zone constructed on floating ice, glacial ice, or compacted snow.

Lead-in Flags—A line of flagging extending out approximately 2 nautical miles from skiway/ice runway threshold to aid in aligning the aircraft for landing.

Markings—Flagging used to define ski airfields and ice runways; usually constructed of fabric and bamboo poles.

Open Snow—A planned LC-130 open field landing zone that is unmarked and ungroomed.

Polar Landing Zone—A planned LC-130 landing surface that includes skiways, ski landing areas, ice runways, or open-snow areas.

Ski Airfield—Marked airfields for ski aircraft operations that include skiways and ski landing areas.

Skiway—A ski airfield marked per DAFMAN 13-217 that allows for ARA approaches to reduced weather minimums.

Ski Landing Area—A ski airfield marked per DAFMAN 13-217 that has reduced flagging from that of a skiway.

Surface and Horizon Definition—Terms used to describe the ability to visually discern airfield surface and horizon defined in terms of Good, Fair, Poor, or Nil.

Attachment 2

POLAR MOBILITY PERSONAL PROTECTIVE EQUIPMENT (PPE) (RED BAG)

Figure A2.1. Minimum Polar Mobility PPE.

ECW Survival PPE ¹		Daily Use Polar Duty PPE ²	
Expedition Bag or equivalent	1 ea.	50L Quick Egress Backpack	1 ea.
ECW Parka w/ hood & Bibs/Pants	1 set	Insulated work gloves	1 pr.
Temp. Rated Waterproof Boots	1 pr.	UV Goggles w/hard case	1 ea.
Mountaineering Wool Socks	4 pr.	UV Sunglasses	2 pr.
ECW Mittens w/ liners	1 pr.	Insulated Flight Boots	1 pr.
Water Bottle (Lexan)	1 ea.	Wind Stopper hat	1 ea.
Merino Wool Thermals (light)	2 pr.	Wind Stopper Balaclava	1 ea.
Polar Tec Thermals (medium)	1 pr.	Wool socks	1 ea.
Fleece Jacket & Bibs Thermals (heavy)	1 set	Massif Jacket	1 ea.
Temperature Rated Sleep System	1 ea.	Massif Pants	1 ea.
ECW Hat	1 ea.	Massif Flame-Stretch Thermals (Heavy)	1 ea.
		Massif Hot-Johns Thermals (Medium)	1 pr.
		Carhartt Extreme Jacket & Bibs**	2 pr.
		Respirator & filter**	1 set
		Polar Fleece Hood**	1 ea.
		** as required by crew position	
Note 1: ECW Survival PPE (left column) will be carried on all Polar Missions. (T-3)			
Note 2: Daily use Polar Duty PPE (right column) can be carried/worn in any configuration at the discretion of the user based on crew position/mission requirements.			
The Polar Mobility PPE listed above is the minimum mobility gear issued to LC-130 aircrew members for deployment to Antarctica.			