

**AIRCRAFT
AND CARGO**

Field teams conducting research within 100 miles of McMurdo Station, including near-station areas inaccessible by ground vehicle, will likely be transported via helicopter. Teams working further afield will likely travel via fixed wing aircraft.

In the months leading up to deployment, project PIs identify desired flight dates, destinations and cargo requests when submitting their SIP. Through discussions and logistics planning with all groups, each team is allotted a certain number of flight hours and flight days, as well as cargo limits, all of which is determined prior to deployment and outlined in the RSP. (As flight hours and days are carefully planned for the entire season, midseason requests for more hours or flights are often declined.) Deadlines for submitting SIPs to USAP Cargo (aka Science Cargo) are established by Science Cargo staff and included with the helicopter or fixed wing instructions in the Crary Grantee Binder upon arrival.

When teams arrive on station, flights approved in their RSP will have been established in a weekly schedule of placeholders. Shortly after arrival, teams meet with fixed wing or helicopter staff to discuss their field plans in detail and obtain aircraft designations and the planning ACLs. Field teams must request each flight three business days in advance. Exact flight dates and times are decided the day before the flights and may change due to aircraft availability or weather.

Cargo Requirements

Before their scheduled flights, field teams must carefully review their field planning checklists for critical timelines. Teams are responsible for preparing cargo and providing cargo information and passenger names to fixed wing and helicopter staff.

Fixed wing cargo prep takes place at Science Cargo (BL073), where items are packaged, weighed, labeled and given a shipping number. Field teams are responsible for gathering their cargo (including field gear) and ensuring it is transported to Science Cargo. To obtain the mandatory shipping numbers for fixed wing cargo items, complete the Science Cargo form

that records the weight and cube (i.e., volume in cubic feet) of each item, physical description, deliver-by date and project number. If you have any questions, ask Science Cargo staff for assistance. Field teams must maintain a list of their shipping numbers and related information to plan cargo loads. Ensure you know the timeline for packing and submitting cargo, as cargo submitted too near your departure may be rejected, which can delay your deployment to the field.

For helicopter flights, field teams must gather and weigh all their cargo and coordinate with helicopter technicians (helo techs) to transport it to the helicopter pad. All cargo weights and dimensions must be submitted to helicopter staff 72 hours before the flight.

Hazardous Cargo

Cargo that is flammable, explosive, poisonous, radioactive, corrosive, under pressure or capable of releasing toxic fumes is hazardous for aircraft operations. Contact the hazardous cargo supervisor with any questions about potentially hazardous items. Common types of hazardous cargo include the following:

- Battery (e.g., acid, car, lithium)
- Burn paste
- Detonator
- Explosive
- Fire extinguisher
- Fuel drum (e.g., AN-8, MoGas, Premix)
- Gas stoves (e.g., Coleman, WhisperLite)
- Hand sanitizer
- Heater (e.g., Herman Nelson, kerosene, propane)
- Hurdy gurdy (i.e., hand-cranked device for getting fuel out of drum)
- Isopropyl alcohol

- Jerrican, full or empty of fuel (e.g., AN-8, kerosene, MoGas, Premix)
- Jiffy drill (i.e., handheld, gas-powered ice drill)
- Matches
- MSR fuel bottle (for deep-field survival bag or WhisperLite stove)
- Power generator
- Pressurized gas cylinder (e.g., helium, nitrogen, oxygen)
- Propane
- Snowmobile
- Spray can (e.g., paint, WD-40)
- Stove fuel (i.e., white gas)

Preparation

Hazardous cargo must be packaged, labeled and handled to minimize danger to the aircraft, passengers and crew, a process that cannot be rushed. As such, field teams must identify and submit hazardous items to Science Cargo at least five business days before a fixed wing flight or three days before a helicopter flight. Failure to do so means the items may not be cleared for the flight, as last-minute assistance is usually unavailable.

Each hazardous cargo item requires a Shipper's Declaration for Dangerous Goods (haz dec). This form records details on the item's type, packaging and emergency response requirements. A haz dec for each item is included with the flight manifest paperwork. Field teams must keep copies of all haz decs, which may be needed during camp takeout.

Retrograde

Retro is any cargo heading in the opposite direction of its deployment (e.g., north from Antarctica or from field camp to station). When field parties retro hazardous cargo from the field, it must be properly packaged and labeled.

Partially full fuel drums must be tightly capped. Ensure spill containment is in place to catch any leakage, then tip the fuel drum on its side to confirm a good seal. Containment must also be used if the drums are shipped on their side. Snowmobiles must have between a quarter and half tank of fuel — no more, no less. Liquid fuel containers (e.g., drums, jerricans) must have the type of fuel written on them in permanent marker. Propane tanks and other pressurized containers must be in good condition and free of rust or damage. Package other retro similar to how it was originally shipped (e.g., matches in foil, 12-volt batteries in wooden boxes).

Preserving the packaging, labels and paperwork generated for the cargo's field deployment makes it easier to prepare cargo for return shipping or entry into the USAP logistics stream. Flight crews also require a haz dec for each hazardous retrograde item returning from the field to McMurdo Station.

Resupply

Before deploying, field teams prepare their camp resupplies by packing boxes with desired items (e.g., food, fuel, equipment) and keeping a careful inventory of each box. Boxes are marked and equipment items are tagged with the science group number, item or box number, destination, and weight. If the project has been allocated a cage, non-hazardous items are stored there.

Field teams provide copies of the resupply inventory to the BFC supervisor, as well as the Fixed Wing Office or Helicopter Office depending on the type of aircraft supporting their camp, and take a copy into the field. When deployed teams are ready for a resupply, they contact the Fixed Wing Office or Helicopter Office (or Central Comms if there is no answer) to request a specific box (e.g., box #2). Camps with phone access to McMurdo Station can call individual departments for resupply items. When resupplying a hazardous item, field teams must provide Science Cargo at least two days' notice so it can deliver the item to the aircraft.

Resupply delivery will be coordinated. For helicopter-supported camps, flights already scheduled to move field camps during the season or provide transport for day trips away from camp are efficient ways to transport resupply boxes. Resupplies in fixed wing camps happen as flights are available. Typically, camps will have a notion of the week's incoming flights and can coordinate what arrives on each flight according to its ACL. Many deep field locations will not receive a resupply and should plan to take everything they need at the start of the season. See the Field Camp Operations section for more details.

Frozen Food

Frozen food for large, ASC-staffed field camps is pulled, packaged and turned over to Science Cargo by ASC personnel. The food is then stored in McMurdo Station food service freezers. For smaller deep-field camps, the food is pulled as close to the three-day advance deadline as possible then stored in the airfield freezer.

A few hours before the flight, Science Cargo transports the frozen food to the aircraft. If the flight is delayed or canceled, Field staff must ensure the food is returned to the airfield freezer. For helicopter flights, the food is stored in the BFC freezer until it is ready for transport to the aircraft by helo techs.

Frozen food that has traveled to the field cannot be returned for use at McMurdo Station. At the end of the season, frozen food can be left at camps that it will be occupied the next season or is treated as food waste.

Fixed Wing Support

Teams entering the field via fixed wing aircraft will fly on an LC-130 Hercules operated by the New York Air National Guard (NYANG) or a Basler or Twin Otter aircraft operated by Kenn Borek Air, Ltd. (KBA). Flights on these aircraft are scheduled by the Fixed Wing Office after you have put in your flight request.

Aircraft and Flight Characteristics

Characteristic	LC-130	Basler	Twin Otter
Maximum seating	40 passengers 2 pilots 1 navigator 1 flight engineer 2 loadmasters	18 passengers 2 pilots 1 flight attendant	19 passengers 2 pilots
Cargo door	Aft door w/ramp (10' × 9' 2")	Side door (5' 11" × 4' 8")	Side door (4' 8" × 5' 1")
Cargo space	4,016 ft ³ (6 pallets; various configurations)	1,225 ft ³	126 ft ³
Maximum round-trip flight	~8.0 hours	~10.0 hours	~10.0 hours w/fuel stops
Flight from McMurdo to			
Siple Dome	2.0 hours	2.5 hours	3.3 hours
South Pole	2.7 hours	4.5 hours	6.0 hours w/fuel stop
Byrd Camp	3.0 hours	4.5 hours	6.0 hours
West Antarctic Ice Sheet (WAIS) Divide	3.3 hours	5.0 hours	6.0 hours w/fuel stop

LC-130

The LC-130 Hercules is the largest ski-equipped aircraft used in Antarctica. These airplanes have four turboprop engines and can carry more payload than the Basler or Twin Otter but require a longer skiway length. LC-130s are loaded and unloaded via a large rear hatch with a ramp, which can accommodate a small forklift.

Basler

Baslers are twin-turbine, propeller-driven airplanes outfitted with skis. They are the larger of the two KBA-operated

aircraft used in Antarctica. Baslers are loaded and unloaded from a cargo door near the left rear of the aircraft. They cannot accommodate U.S. Air Force pallets. Cargo and equipment going on Baslers must be packed in containers that can fit through the cargo door and can be moved by one or two people.

On KBA-operated aircraft (i.e., Baslers and Twin Otters), field parties must help load and unload cargo. Snowmobiles are lifted to or from the cargo door or slid onto the cargo ramp, while full fuel drums are rolled down the cargo ramp for offloading. Always consult with the aircraft crew for directions.

Twin Otter

Twin Otters are short-takeoff-and-landing utility aircraft that can operate in a variety of conditions. Like Baslers, they are equipped with skis, have twin engines and are loaded and unloaded by hand through a rear cargo door. The space in a Twin Otter is limited, but it can be fully utilized by preparing small cargo packages that are easily handled by one or two people. Allowable Cabin Load

The ACL is the amount of weight allotted for cargo and passengers on a given flight and varies by the aircraft's capacity, trip distance, airfield conditions and other factors. The planning ACL is determined by the aircraft crew during the flight's planning stage and may change during the lead-up to flight day. A field team's total cargo and passenger weight cannot exceed the ACL.

Camp Put-in

Camp put-in may require multiple flights. Field teams must ensure all essential, life-sustaining supplies and equipment are on the first put-in flight in case the second is delayed. This includes radios, satellite phones, sleep kits, stoves, matches, extra clothing, tents, and enough food, fuel, and water for an extended period. There have been cases where a field party waited two weeks for a second flight that was

supposed to arrive on the same day as the first. Field teams must be flexible and have plans for a worst-case scenario.

Radio Issue

Before field deployment, project personnel must obtain a frequency assignment plan and radio call sign from Central Comms. Every member of the field party should attend the Field Party Shop radio briefing, where they will be issued the following items and receive instructions:

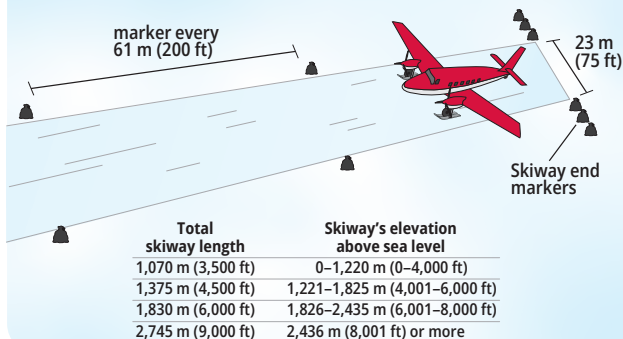
- VHF radios with field party frequency plan
- Iridium satellite phone(s)
- HF radios
- Handsets
- Antennas
- Batteries and recharging capabilities for the entire deployment
- Complete backup radio

Skiway Preparation

Before deploying, field teams must discuss how to prepare the skiway (a runway cut into the snow for planes with skis) for the takeout flight with fixed wing staff. If a team is preparing a skiway, fixed wing staff must provide bamboo poles, flags and large black trash bags (filled with about two shovels of snow each) to use as skiway markers. The flags also help identify wind speed and direction.

This task is specific to the camp location and type of aircraft, so prior planning is essential. Teams involved in any way with creating a skiway must attend a meeting with Fixed Wing and KBA. Below is an example of a Basler skiway for KBA aircraft. Skiways for LC-130s require meeting with NYANG, Field Ops and the Fixed Wing Office.

Basler Skiway Specifications



Recce

NYANG, KBA, FS&T or the Fixed Wing Office may determine that a reconnaissance flight (recce) is required to assess aircraft landing conditions or surface routes before the put-in. Fixed wing staff work with the aircraft operator and field team to define the recce's scope and requirements. Taking additional people or cargo on recce flights is situational and at the discretion of the operator and ASC.

Bag Drag (LC-130s Only)

Bag drag involves weighing field personnel and their baggage. It occurs at least 12 hours before an LC-130 flight and is when all personal gear (e.g., clothes, personal items) must be checked in. Checked-in items will not be available if the flight is canceled. But passengers are allowed one hand-carry bag for shoes, a change of clothes, medications, and needed toiletries (e.g., toothbrush). Phones, radios, and weather kits must also be hand-carried so they stay warm and operational and so field teams can establish communication with McMurdo Station or field camps before the aircraft departs. Air Services posts bag drag details, the flight schedule, and flight updates

in three places: the transportation channel, at the MCC, and outside the dining facility in BL155.

Flight Day

These are general guidelines for flight day. Minor schedule changes may occur each season. Check and adhere to the flight day instructions on the McMurdo intranet and in the Crary Lab / grantee binder.

On flight day, field teams must be prepared to report to the MCC (BL140) for LC-130 flights or to their shuttle pickup area for KBA (i.e., Basler or Twin Otter) flights. You will receive the reporting time on the Fixed Wing flight schedule the night before. Verify that time on the Public Area Display System (PADS; Channel 7 on the television) 7 on the morning of the flight. All passengers must wear ECW gear. Passengers wearing personal ECW gear must present the yellow form titled Bring-Your-Own ECW Clothing Program (FLD-FRM-0002) at the MCC or airfield as applicable. At the airfield, passengers must follow the instructions of the loadmaster for LC-130 flights or the flight crew for KBA flights, who direct all movement in and around the aircraft.

Check your cargo at this time. Do not assume all cargo details have been addressed. Inspect snowmobiles, and ensure the keys are available. Ensure all survival gear (e.g., radios, sleep kits, tents, stoves, food) is present. Check the cargo manifest against what is actually on the aircraft. If something is missing, immediately notify the loadmaster, who will inform the aircraft commander to halt flight preparations. Cargo staff must also be advised of the missing cargo.

During put-in and before the aircraft departs, field teams must radio Central Comms and erect a tent for shelter, well away from the aircraft and turning area. (See the Field Camp Operations section for details on field planning and tasking and the Communications section for operating various radios.) If possible, split the team into one group who sets up the tent and lights a stove and a second group who sets up the radio and antenna and communicates with Central Comms.

Field teams must also establish grid north at camp and obtain the camp's altitude from the aircraft navigator or pilot. They must immediately mark grid north with two flagged bamboo poles and use the altitude reading to set the altimeter in the meteorological kit. Both tasks are necessary for weather observations and reporting.

Takeout

- **Scheduling:** Coordinate the camp takeout schedule with the Fixed Wing Office, which will need details on the following:
 - Weight, cube and type of retro
 - Estimated weights and dimensions of any cargo pallets
 - Handling requirements for any science samples (e.g., do not freeze [DNF], keep chilled [KC], keep frozen [KF], keep upright [KU])
 - Any additional lead time needed for ice core samples
- **Waste Removal:** Remote deep-field teams must return all waste to McMurdo Station, which may include human waste. All waste needs to be labeled and sorted into categories. See the Environmental Policies section for details.
- **Equipment Staging:** Break down the entire field camp. Stage all gear so it is ready to be quickly loaded onto the aircraft when it arrives. LC-130 flights require all gear to be palletized.
- **Skiway Preparation:** Prepare the skiway well in advance of the aircraft's arrival, as instructed by the Fixed Wing Office or pilot before deployment.
- **Weather Observations:** When an aircraft mission to camp is planned, field teams must report weather observations every hour, starting six hours before an LC-130 takes off or three hours before a KBA-operated aircraft departs. These observations continue until

the aircraft lands in camp. See the Weather and Sea Ice section for details.

- **Aircraft Communication:** The field team member assigned to the radio is responsible for communicating information to the incoming aircraft. They must be aware of and able to relay the skiway condition, current wind conditions, and altimeter setting to the aircraft. While on final approach, the aircraft commander will limit radio communication but appreciate brief statements about any wind direction or weather changes. Do not interfere with the aircraft during final approach unless there is an emergency.
- **McMurdo Arrival:** Return all field equipment to the appropriate work center. Package and mark retro cargo that will return to the U.S. For details, see the “Instructions for Packaging and Shipping” document provided to all researchers before they deployed to Antarctica.

Helicopter Support

All USAP personnel must attend helicopter training before boarding a helicopter for the first time. This occurs at the end of your AFS course. If you will be required to build any sling loads, you must also attend a sling load training in the Helo Hanger. (See Building Sling Loads below for details.) USAP operates a small fleet of helicopters in the McMurdo Station area under Federal Aviation Administration regulations. The fleet consists of two models: the A-Star (aka Airbus AS350 B3 or “Squirrel”) and Bell 212. These helicopters are single-piloted, meaning the pilot is responsible for all aspects of the aircraft’s operation.

Helicopter and Flight Characteristics

Characteristic	A-Star	Bell 212
Maximum seating/payload	3 passengers or ~800 lb	8 passengers or ~1,800 lb
Hatch	5' 6" × 3' 6"	7' 8" × 4' 2"

Characteristic	A-Star	Bell 212
Cargo space	5 ft³	253 ft³
Maximum round-trip flight	~2.5 hours	
Flight from McMurdo to		
Cape Bird	30 minutes	
Koettlitz Glacier	30 minutes	
Minna Bluff	30 minutes	
Mount Erebus	30 minutes	
Marble Point	31 minutes (47 minutes w/external load)	
Lake Hoare	34 minutes (50 minutes w/external load)	
Cape Crozier	35 minutes	
Dry Valleys	35–40 minutes	
Allan Hills	1 hour	

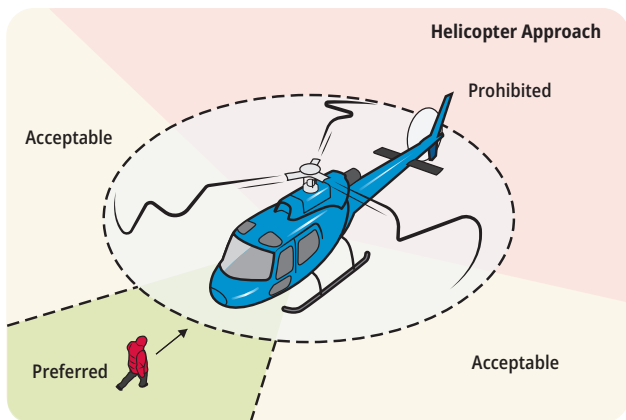
Helicopter Pad

Aviation administrative and logistics offices, including those of the helicopter supervisor and aviation coordinator, are in the maintenance hangar at the helo pad. The small silver structure to the side of the hangar is the passenger terminal, where field teams report for helicopter flights. There, a helo tech will brief deploying field teams and escort them to the helicopter. Personnel may walk to the passenger terminal without clearance or an escort. However, never drive onto the helo pad without radio clearance, and never walk onto the helo pad without an escort.

Safety

- Any movement on the helicopter pad or in the hangar must be authorized by helo pad staff.
- Always follow the pilot's orders.

- Never approach a helicopter until the pilot gives a thumbs-up signal.
- When permitted to approach, remain in the pilot's view and approach from the front of the helicopter whenever possible.
- Never walk near the tail rotor.
- Never reach up or chase after a hat or other item that has blown away.



- Carry long loads (e.g., bamboo poles, Scott tents, survey rods) low and level to the ground.
- Always approach or exit the helicopter on the downslope for more clearance from the main rotor.
- Stop if you are blinded by snow or debris being kicked up by the rotor wash, crouch low or sit, and await help.
- Exit slowly and smoothly if disembarking while the helicopter hovers.
- Never approach or leave when the engine and rotors are running down or starting up.

Helicopter Safety

Carry supplies and tools horizontally and below waist level.



Always approach or exit on the downslope for more clearance.



Stop if blinded by snow or debris, crouch low or sit, and wait for help.



Exit slowly and smoothly if disembarking while the helicopter hovers.



Never approach or leave when the engine and rotors run down or start.



- Do not smoke in or near the helicopter.
- Remain seated with seat belts and helmet fastened while inside the helicopter.
- Assume the crash position if warned by the pilot.
- In an emergency, remain in the aircraft until all motion has stopped.
- Know the location and operation of emergency exits.
- Know the location of first-aid kits.
- Know the location of aircraft survival bags, which helicopter staff ensure are aboard the aircraft and will be pointed out during the final safety briefing on flight day. (Note that if the flight is for a camp put-in and all the required camp survival gear is aboard, no aircraft survival bags are required.)

Camp Put-in

Radio Issue

During the pilot brief, team members should discuss which channel will be used for communications between the helicopter and field team. For a camp put-in, teams must have the following equipment:

- VHF radios with field party frequency plan
- Iridium satellite phone(s)
- HF radios
- Handsets
- Antennas
- Batteries and recharging capabilities for the entire deployment
- Complete backup radio

Field Plan

Field parties must confirm their field plan for the season with the Helicopter Office. This plan should include estimated

dates for camp put-in, camp moves, day trips, close support, resupplies and camp takeout.

Cargo

Before deploying, field teams specify estimated cargo weights, passenger names and a list of hazardous cargo in their flight request, which must be submitted to the Helicopter Office via the McMurdo intranet three days before flight day. Field teams are also responsible for delivering hazardous cargo to Science Cargo for packing no later than three business days before the flight.

The day before the flight, field parties collect all cargo (including BFC, MEC and science equipment) and arrange for its transport to the helo pad. Special arrangements can be made for gear or equipment that the teams must have access to until flight day. A helo tech will prepare the cargo and provide a final manifest to the pilot. Each passenger will be weighed, and the weight and volume of all cargo will be measured. The helicopter schedule is posted by 1900 hours on the McMurdo intranet and also sent to each passenger via email. Unexpected or emergency flight requests should be communicated to the Helicopter Office as soon as possible.

Flight Day

The Helicopter Office must be able to quickly notify the field team of any schedule changes on flight day. Weather-related changes are common. If a field team was issued a pager, it must remain switched on. If the team does not have a pager, the Helicopter Office must know where to contact the team.

All personnel and equipment must be at the helo pad 45 minutes before the flight. All passengers must wear USAP-issued or personally owned ECW gear. Passengers wearing personal ECW gear must present the yellow form titled Bring-Your-Own ECW Clothing Program (FLD-FRM-0002) at the helo pad.

Loading and Unloading

In McMurdo Station, helo pad staff will load and unload cargo. (At field locations, field teams must perform this function.) On most Bell 212 flights, a helo tech will be aboard to assist with loading and unloading. Helo techs do not fly on A-Stars, so all field team members are responsible for knowing how to load and unload the helicopter. The helicopter pilot is ultimately responsible for passenger safety and will determine whether the helicopter can be loaded or unloaded while the rotors are running. However, each passenger has the right to request that the rotors be shut down if there is any safety concern.

For all flights, helicopter pad staff will ensure enough survival bags are on board to accommodate all passengers. If a flight is for a camp put-in and all the required camp survival gear is aboard the aircraft, no survival bags are required.

Boarding

On Bell 212 flights, a helo tech leads field teams to the helicopter when the pilot is ready for boarding. On A-Star flights, the pilot will indicate when passengers can board. At the helicopter, the pilot or a helo tech will give a final safety briefing and identify where survival bags are located. Once seated, passengers must strap themselves in and connect to the intercom system. Passengers must not talk to the pilot during takeoff or landing.

Disembarking

At camp put-in, after passengers disembark the helicopter, the pilot monitors Channel 7 and delays departure until a field team member establishes radio contact with the pilot and calls out the helicopter's tail number. If communication cannot be established because of radio malfunction, the team will be flown back to McMurdo Station.

Day Trips

Projects that plan to remain in the field for the day must have at least two people, survival bags, ECW gear, urine bottles, plastic bags for human waste and two forms of communication devices (e.g., VHF and Iridium). All personnel should be aware that weather or other circumstances may require them to stay in the field overnight. As such, pack extra water, extra high-energy food, extra warm clothes, reading material, and a toothbrush for day trips. Sunscreen, ear plugs, and a Thermos with hot liquid are also recommended.

In-field Coordination

Helo Ops staff begin developing their operational plan after 0730 hours each day. On the day a flight is scheduled for a field camp, the deployed field team must provide a local weather observation to the Helicopter Office between 0700 and 0730 hours. Any changes to the day's plan or information about the support needed must also be communicated at that time.

New flight requests and changes to flight schedules must be submitted to the Helicopter Office three days in advance. Requests may be communicated via radio or telephone, or they may be written and passed to helo pad staff via a pilot.

Sling Loads

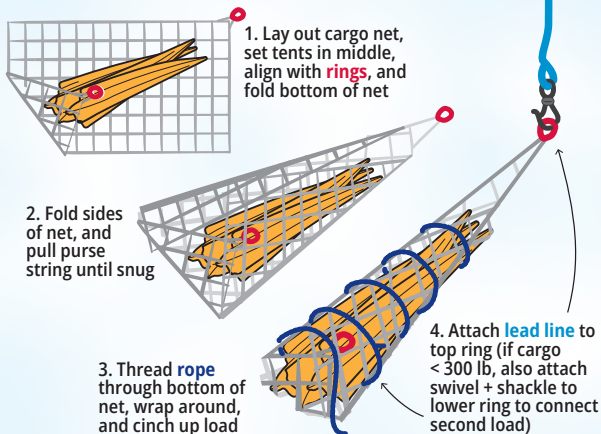
Sling loads are cargo suspended from aircraft and commonly used to transport equipment to or from McMurdo Station. You may be responsible for or assist with building the loads, which is most common in the Dry Valleys and on Mount Erebus. Sling load training covers several techniques for building and staging loads. Only trained persons can build or assist with sling loads, as faulty cargo rigging and transport can lead to catastrophic accidents.

PRO TIPS

- Helicopter pilots approach sling loads into the wind, so build loads with wind direction in mind. Also ensure there are no obstructions to the approach.
- Loads must be placed in the center of the cargo net as symmetrically as possible.
 - Barrels are much easier to de-rig when they are upright.
 - For propane tanks, use extra cargo straps to create a barrier across their tops and keep net lines away from valves.
- Before hooking up sling loads to a hovering helicopter, discharge the static electricity the aircraft generates (e.g., with a grounding pole).
 - Ideally, attach sling loads while the helicopter is on the ground.
- Watch loads being lifted into the air or placed on the ground. Field staff can assist with any issues that arise.
- You can always ask the pilot to power down the helicopter to inspect the load before attaching it to the aircraft.

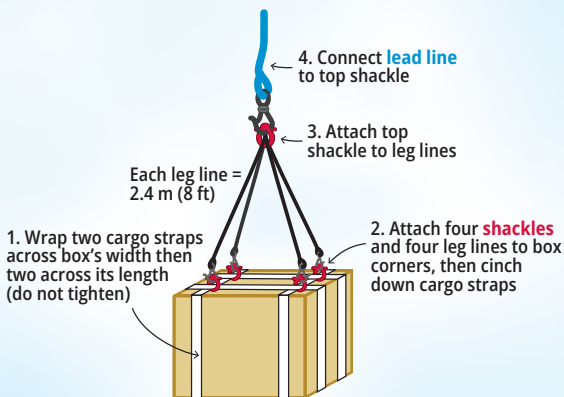
Some examples of sling loads are depicted next. Detailed instructions are also available in the Marble Point Operations Manual (FLD-MAN-0001; formerly OPS-MAN-0009).

Sling-loading Scott Tents



Sling-loading a Christmas Package

(Method when cargo [e.g., Jamesway floors] exceeds size of net)



Sling-loading White Pallet Boxes

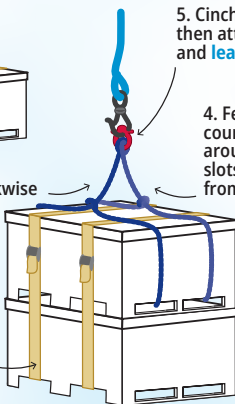
(Method when camps move several times during season)

1. Load box evenly then secure lid with cargo straps so ratchets are on long side of box



3. Feed first **choker** clockwise around top box, through slots then up into loop from left

2. If stacking two boxes, put heavier box on bottom and run cargo strap around both



5. Cinch chokers tight, then attach to **shackle** and **lead line**

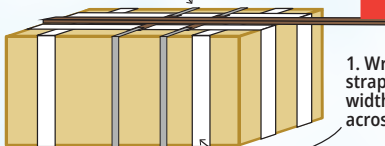
4. Feed second choker counterclockwise around box, through slots then up into loop from right

Adding a Fin to Long, Bulky Cargo

(Method to reduce swinging and spinning of load in flight)

2. Set fin atop cargo so it extends far off the end

3. Secure fin with its own two cargo straps



1. Wrap two cargo straps across box's width then two across its length

Takeout

- **Scheduling:** Coordinate the camp takeout schedule with the Helicopter Office, which will need details on the following:
 - Weight and type of retro
 - Handling requirements for any science samples (e.g., DNF, KC, KF, KU)
- **Station Accommodations:** Before returning from the field, all field parties must contact the Housing department at McMurdo Station to arrange accommodation.
- **Incremental Retro:** Returning unneeded material and equipment to McMurdo Station throughout the season makes camp takeout easier.
 - Whenever possible, use helicopter flights scheduled for resupplies, camp moves or day use to retro your cargo. This reduces the number of takeout flights.
 - Helicopters can sling loads back to McMurdo Station or Marble Point for staging, so do not let boxes and barrels pile up at camp. Retro them early.
 - Indicate what cargo is ready for retro during daily communications with Helo Ops staff, so they can schedule retro on flights of opportunity.
 - Properly label retro waste per instructions from the Environmental Engineering and Waste departments.
 - See the next subsection for special handling of science samples.
- **Last Flight:** To ensure all camp items are picked up and nothing blows away, two field team members should remain in the field to accompany the last flight.

Retrograde of Samples

Fixed wing aircraft or helicopters can transport unaccompanied scientific samples from the field to McMurdo Station. All

persons involved with handling or transporting samples must follow established procedures to protect the scientific data and reduce the potential for loss or damage during transport, receipt and storage. Years of planning, months of work and extensive NSF funding have been invested into these samples. They are irreplaceable.

Field teams intending to retro unaccompanied scientific samples follow these steps:

1. Before deploying to the field, discuss the retro process with Crary Lab staff.
2. Obtain “sensitive sample” chain-of-custody (COC) forms and green Day-Glo labels, or “non-sensitive sample” COC forms and pink Day-Glo labels, from Crary Lab.
 - A. COC forms and labels are available for all samples sent unaccompanied to McMurdo Station from the field.
3. While in the field, package the samples in a manner that adequately protects them against temperature variations and vibration during transport.
 - A. Proper packaging is the grantees’ responsibility.
 - B. Packaging should be sufficient to cover extended periods due to weather or other delays.
 - C. If you require insulated packaging, (e.g., coolers, AcuTemp containers), contact Crary Lab.
4. Notify the Crary Lab POC (x44175, pager 855 or at MCM-Lab-Samples@usap.gov) or the Science Cargo supervisor that the samples are ready for pickup and provide the following information:
 - A. Number of containers
 - B. Storage requirements
 - C. Time of pickup
 - D. ETA in McMurdo Station
5. Schedule the pickup with AvOps.

6. Make necessary entries on the COC forms.
7. Attach the Day-Glo notice to the sample boxes to facilitate identification and tracking later.
 - A. These brightly colored labels draw attention to the boxes and reduce the likelihood they will be misplaced or overlooked.
 - B. If the form cannot be attached to the box's exterior with tape, it can be tucked inside.
8. When the samples are loading onto the aircraft, update the COC forms with the aircraft tail number and the time the samples were loaded.
9. Pilots, loadmasters, helo techs, ground crew, Crary Lab staff, Science Cargo and other persons involved in the cargo process will fill out their portions of the COC forms and deliver the samples to the appropriate location.
10. If any samples are missing form, staff will assist field teams with getting the samples transported, documented and handled.