Toolik Field Station Helicopter Safety Manual

BATTELLE
Arctic Research Operations

Battelle ARO, Polar Field Services 2024

Toolik Field Station Helicopter & Outdoor Safety Manual

Version	Date
Mimi Fujino	March 2010
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Greg Huey (HSE)/Patrick Proden (Alaska Operations Manager)	October 2023
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This is an open, working manual.

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Introduction

This manual is a basic guide to helicopter operations at Toolik Field Station. It includes what to bring with you on a flight, planning procedures, flight operations, working around a helicopter and outdoor safety concerns.

Our first concern is your safety. We hope this manual will help prepare you for safe and efficient flight operations at Toolik.

Passengers

Battelle ARO can only transport National Science Foundation (NSF)-funded researchers in the helicopter schedule. In other words, groups may not volunteer to host trips for others.

Battelle ARO supports helicopter work for NSF-funded projects. Any party requesting use of the helicopter needs pre-approval for flight time.

Requests should be identified in advance. All requests require NSF approval. Researchers who need additional time (or those who were not granted helicopter time but may require or benefit from this use) must identify the following:

- Number of flight hours requested.
- Science justification for the use.
- Details – dates, passengers, amount of gear, etc.

Principal Investigators should identify in advance any additional personnel (including journalists or teachers) requiring support.

- If they are considered a part of the research team, they may accompany the team and flight hours will be billed to the grant.
- If they are working independently, the request will need prior approval, as above.

The onsite Battelle ARO Helicopter Coordinator does not have the authority to allocate hours – nor do the pilot or crew. The Helicopter Coordinator is also not the supervisor of the pilots, but rather works collaboratively with the aircraft team. If safety concerns or other issues arise, please contact the Toolik Camp Manager on station and/or the Battelle ARO Alaska Operations Manager.

Research Volunteers

The only passengers allowed on the helicopter are the NSF-funded researchers listed in the schedule. Aviation safety, insurance and liability are of major concern. Battelle ARO and/or the flight crew cannot give rides to volunteers.

General Air Safety Guidelines

Aircraft travel can place you far from medical help, spare parts, or food and shelter. Every researcher must be well prepared prior to heading into the field. Weather changes, mechanical breakdowns and medical emergencies must be considered in your safety plans.

Battelle ARO requires all researchers using their chartered aircraft to have emergency survival gear and a satellite phone on board. Battelle ARO can assist in providing you with some of these items.

Seal critical items such as clothing and important documents in plastic bags as a precaution against water damage.

Recommended Additional Survival Gear

- Space blanket or sleeping bag
- GPS
- First aid kit
- Bivouac, tarp, or small tent
- Therm-a-rest or insulated pad
- Emergency signal mirror
- Pocketknife
- Bug repellant
- Bear spray (hazardous cargo)

Battelle ARO Basic Survival Bags

Survival Bags

Survival bags are required for any party using the helicopter to fly more than two miles away from Toolik Field Station. The contents are listed in detail below. One survival bag is provided for demonstration purposes at the Helicopter Coordinator's office.

In 2024, the summer helo survival bags were revamped with the goal to create a lighter and less bulky, yet robust helo survival bag which supports three people due to the R44 carrying capacity. The 3-person ultralight Helo Survival bag weighs 9-10 lbs., 1/3 of weight and half the bulk of the previous bags. Key changes between the former bag and the new ultralight bag are that it does not include a real tent and replaces sleeping bag/pad with thermal bivies. The heavier bags also remain available for use.

We strongly encourage anyone who is interested to stop by the helo tent, review the contents, and ask for assistance in the operation of any of the components. If any of the bags are opened or tampered with for any reason, please report this directly to the Helicopter Coordinator upon returning from your flight.

Quantity	Item in ultralight survival bag
1	Sealine 35L Dry Bag
1	Rab 3-4p survival shelter
3	SOL Escape Bivy
1	SOL Scout Survival Kit
3	Potable Water Tablets
1	3600 calorie ration bar
1	First aid kit
1	Gerber Dime Multitool
1	Therm-a-rest Ridgerest
1	Toolik Helo Field Safety Manual

Survival Caches

Battelle ARO may provide survival cache(s) at the Burn site, as needed (based on projects flying each season). The coordinates are available through the helicopter coordinator once the caches are set up at the beginning of the season.

The caches contain emergency gear for four people.

Quantity	Item in survival bag
2	2-person tent
4	Ensolite pads
2	Potable aqua tablets
	Waterproof matches
4	Heat sheets (space blanket)
50’	Parachute cord
1	Fire starting tool
1	Small pocketknife
4	Sleeping bags
16	Instant food (4 persons x 2 meals x 2 days)

Pre-flight Planning

Helicopter use occurs every summer at Toolik Field Station. It is a costly resource that needs to be utilized in an efficient manner. While a helicopter may make your work easier and faster, its increasing usage also affects the area you study. Please use this resource wisely. For example, walking to your site and getting a pick-up with your samples, later in the day, will eliminate one round trip.

The Helicopter Coordinator will work with you to ensure efficient usage of your flight hours. Being organized and giving the coordinator your complete flight plan on time is the first step to helping operations run smoothly.

Everyone using the helicopter on a regular basis is required to submit a flight plan directly to the Helicopter Coordinator by 2:00 p.m. the day prior to flying.

For researchers coming to Toolik for only a few days, please email your flight plans to the Helicopter Coordinator before your arrival at: ToolikHelo@polarfield.com.

The following information should be included for each flight:

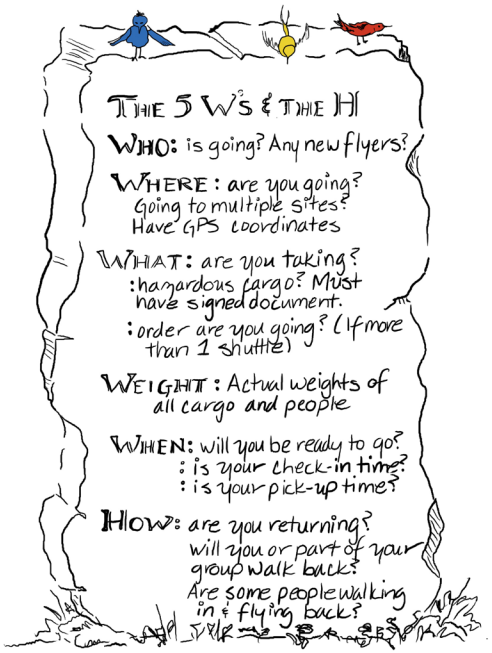
1. Destination and GPS coordinates in degrees, minutes, and seconds. List in order of preference if going to multiple sites.
2. Number of passengers.
3. Estimated cargo load (weight and volume). Cargo must also be weighed by the Helicopter Coordinator prior to the flight.
4. Identify any hazardous cargo.
5. Brief requirements: ground time, closed support, sling load, instrumentation attached to aircraft, other details.

Everyone must meet with the Helicopter Coordinator for a short safety briefing prior to each flight.

By 2:00 p.m. the day prior to your flight

- First and last name of all passengers
- Weight of each passenger
- Accurate weight of all cargo
- Hazardous cargo, turn in all cargo to the Helicopter Coordinator

See Below for Detailed Flight Plan



The Idea and Need for Close Support

Early in the planning process and in scheduling helicopter flights, often Principal Investigators (PIs) will request the need for their team to utilize close support (CS) to meet their needs. CS is defined as when the helicopter stays with the research team throughout the time teams are at a specific field location. At times it is requested due to the volatile nature of the environment where the research is conducted, distance between the location in proximity to Toolik and/or other field-based complexities, safety etc. The majority of flights from Toolik to the field do not require CS and often strain important helicopter resources that can be afforded for use by other research teams. Through careful planning with your Science Project Manager in collaboration with the Alaska Operations Manager on the front end of the season, identifying project needs and appropriate scheduling, the Helicopter Coordinator at Toolik can provide the best and most efficient support mechanisms to help you achieve your science goals. CS should be utilized in the most necessary flight situations and should not be taken for granted or requested to preserve flight hour allocations.

The Day of Your Flight

The Helicopter Coordinator will pick you up at the agreed location with the helo truck. At that time, satellite phones, survival bags, any hazardous cargo, and other items requested will be distributed. A check-in time will be established, and a contingency plan will be finalized.

The Helicopter Coordinator will inform you of any delays. Be sure to look at the bulletin board in the dining hall foyer for other helicopter updates.

Every flight day will be different. Fog, wind, temperature, lightning, snow, freezing rain and icy conditions could prolong, delay, or cancel a flight. Mechanical problems, groups not well-organized, or other unforeseen problems also delay flights. Safety is our first consideration. Help us, help you to be successful with your research activities!

When flights are delayed for more than an hour, your flight plan may need to be revised. Communicate early and often with the coordinator for help to revise your flight plan if it changes.

Pilot Briefing

Make sure the pilot provides you with a safety overview of the aircraft. Understand and identify the location and operation of emergency exits, emergency gear and first aid kits. In the event of a crash and if the pilot is incapacitated, the person in the front seat should know where the battery and the fuel shut off switches are located.

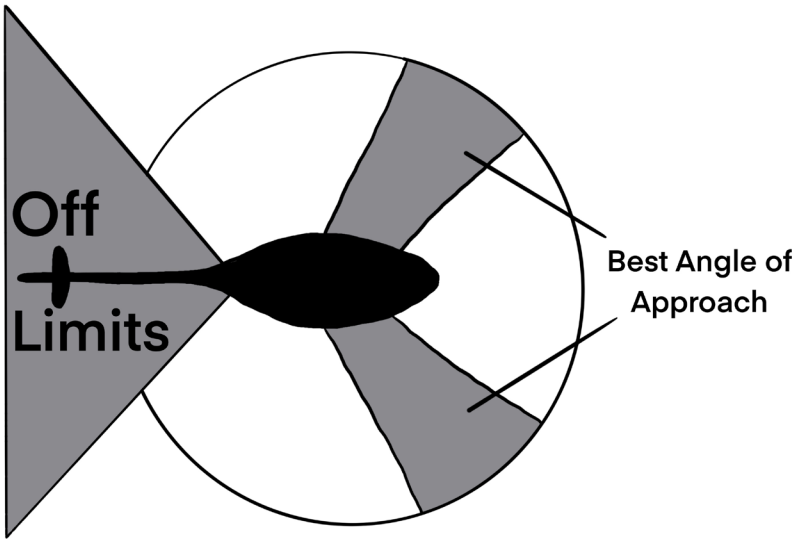
It is required by FAA regulations that the pilot briefs the passengers before every flight. If this does not happen, please let the Helicopter Coordinator know as soon as possible. There is also an end of flight Snap Survey that is part of the helicopter operations starting in 2023 where concerns can be shared with Battelle ARO management.

When traveling with cargo, know its weight and size. All hazardous materials must be packaged appropriately in USDOT certified containers, have accurate paperwork, and made known to the pilot. The Helo Coordinator is responsible for working with the research teams to identify hazardous materials. When support is needed the Helo Coordinator is expected to work with the Alaska Operations Manager and HSE Team.

Approaching The Aircraft

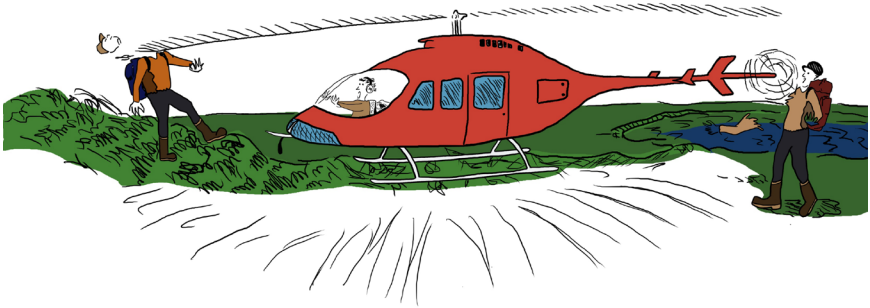
Self-awareness around the aircraft is key. Make eye contact with the pilot. Always receive a “thumbs up” by the pilot before approaching the aircraft in a crouching position. Approach and depart in the pilot’s view. Do not rush around the aircraft. Think about what you are doing and be aware of what others are doing. Carry long items horizontally.

Best Angle of Approach

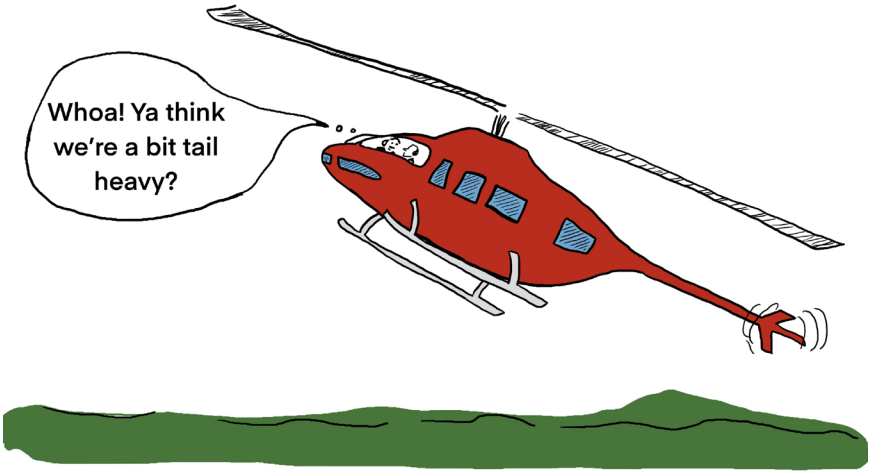


Warning: The greatest danger is at the outside edge of the rotor blades.

NEVER APPROACH ON THE UPHILL SIDE OR NEAR THE TAIL ROTOR!



Loading and Unloading the Aircraft



Make sure all cargo is secure in the cabin and no sharp items are near passengers. Make sure there is a clear path to an exit for all passengers.

If the pilot allows, secure external loads to the baskets or skids.
The pilot will ensure all doors are secured; that loads internal and external are secured and that nothing hangs out of the doors.

Hot Loading

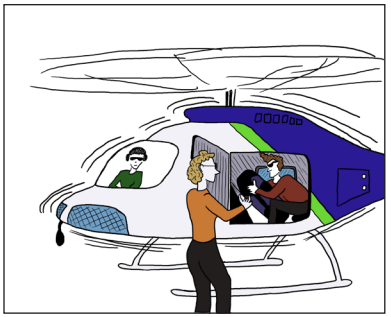
Hot loading is defined as loading an aircraft with one or more propulsion engines running.

- Make eye contact with the pilot.
- Get a thumbs up before approaching the aircraft.
- Approach in view of the pilot.
- Load lightweight items first.
- Carry long items horizontally.
- Do not carry more than you can handle.

Hot Offloading - Technique #1

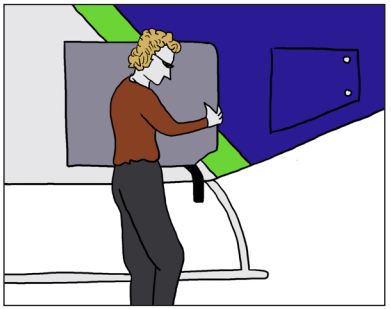
1. Stage gear approximately 2.5 ft. from the skid. Weigh down the lightweight items with the heavier items. Fragile, lightweight items are best carried with you.
2. Double check that all doors are fully closed, and all seatbelts are inside and fastened.
3. All passengers assemble between the aircraft and gear. Make eye contact with the pilot, get a “thumbs up” before departing within view of the pilot. Leave your gear by the aircraft until it departs.

Hot Offloading - Technique #2



Offload heavy items first. Position one person outside of the aircraft to receive the cargo.

Stage your gear well outside the rotor disk. Secure lightweight items with heavier items.



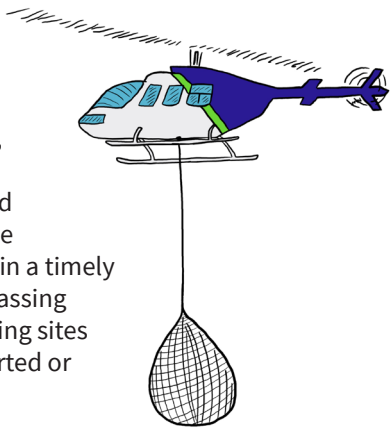
Make sure the seatbelts are not dangling outside the door. Double check that all doors are securely fastened.

After you finish offloading and all gear is secured, clear the pilot for takeoff by giving them the “thumbs up” signal.

When working around an active aircraft the noise level tends to increase people's heart rate and anxiety. Be aware of what others are doing and stay calm. Hearing loss can result from working around a noisy aircraft for extended periods of time. Hearing protection is available from the Helicopter Coordinator.

Rotor wash is the wind generated by the aircraft while landing and taking off. Be especially careful while near an aircraft when rotor wash is present. Protect yourself from any flying debris. If anything blows away, do not chase it until after the aircraft has landed and is shut down or after it has departed.

Sling Loading



Sling load is the movement of equipment by helicopter, from one location to another, using sling sets, cargo nets, and other specially designed equipment. It is intended to move equipment over terrain that may be unsuitable for vehicles or land movements in a timely manner with rapid movement of cargo bypassing surface obstacles and linking multiple landing sites where equipment or materials may be inserted or retrograded.

Limitations of Sling Loading

Depending on aircraft on site, limitations exist including:

- Aircraft capacity
- Load instability
- Adverse weather limits operations
- Landing Zone (LZ) requirements
- Helo availability/cost/maintenance
- Loose debris: struck by and visibility

Load Considerations:

Load considerations require the following:

- Certifiable/Suitable/Unique
- Prohibition Considerations: mass, profile, etc.
- Rigging Points: single, dual, tandem, shotgun
- Stability: equalized, extended, secure
- Free to Rotate in 3 axis

Performance Factors:

Performance factors are influenced by these characteristics:

- Altitude
- Temperature
- Humidity
- Wind
- Payload
- Fuel Load

Safety Focus:

Attention to safety requires diligence especially with:

- Flying Debris
- Foreign Object Damage (FOD)
- Entanglement
- Swinging Lines & Loads
- Footing/Positioning
- Crush Potential
- Direction of Approach

Sling Load PPE:

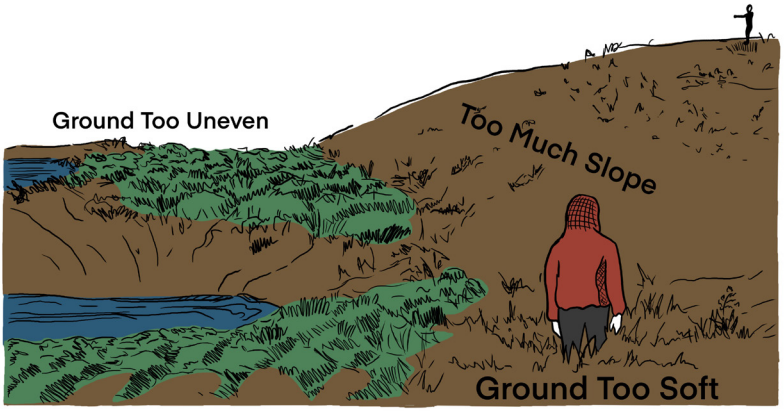
If research teams and others using helo services are equipped with appropriate safety measures and use personal protective equipment, inevitably, there are fewer injuries: PPE includes:

- Hard hat with Strap
- Eye Pro
- Nomex/Leather Gloves
- Hearing Protection
- HVSA – level 1 or above
- All Leather Boot/Safety Shoe

Conduct While in the Aircraft

- Communicate your plan in a clear and concise manner.
- Use the clock face as a reference point, where the nose of the aircraft is at 12 o'clock, and the left side is at 9 o'clock. You can also use the cardinal points: north, south, east, and west.
- Do not talk to the pilot during takeoff and landing unless requested to do so.
- Do not throw items from the aircraft.
- No smoking is allowed.
- Do not unbuckle your seatbelt, open the door, or get out of the aircraft unless instructed by the pilot.
- Follow the pilot's instructions at all times. Be aware of your surroundings. If you see a potential hazard in the area, point it out to the pilot.

Choosing A Landing Site



The best landing site is flat, solid ground with no loose items to blow around in the rotor downwash. Rotor downwash is a commonly ignored phenomenon that occurs during helicopter hover in close proximity to a ground surface. It has the potential to cause significant damage to nearby vehicles and objects, as well as people. The site must have at least 9 ft. clearance around the main rotor blades on the sides and front of the aircraft and 4 ft. from the tail rotor.

Hazardous Cargo

All Battelle ARO chartered flights are required to adhere to the International Air Transportation Association (IATA) regulations. You must report all hazardous cargo to the Helicopter Coordinator ***24 hours prior to your flight***. If you cannot do so, make other arrangements with the Helicopter Coordinator. All chemical and acid solutions must have the percentages of chemical compounds listed on the container.

The following is a list of hazardous cargo often flown:

Frequently flown hazardous cargo	
Acid and acid solutions	Fuel powered engine
Bear spray	Ethanol
Coleman fuel	Gasoline
Compressed air	Isopropanol
Battery, wet sealed*	Kerosene
Diesel fuel	Lithium batteries**
Dry ice	Matches, lighters
Fire extinguisher	Propane

The Helicopter Coordinator will package your hazardous cargo and fill out the required form. All chemicals used in the field need to be identified to the coordinator regardless of the quantity. If you are unsure about an item being hazardous cargo, ask the Helicopter Coordinator. If your cargo was shipped or flown as hazardous cargo, it will be the same at Toolik. To save time and expense, keep the container and box your hazardous cargo was shipped in. It can be used on flights from Toolik.

*Non-hazardous, although it must be packed in a sturdy box and marked “non-spillable battery” on the outside of the box.

**Any equipment containing lithium batteries is considered hazardous. All spare batteries should be in a container which separates the positive and negative contacts. If you have loose batteries, tape the contacts.

Communications

Every group using a helicopter will be issued a satellite phone or a handheld VHF radio. Each unit will be fully charged and come with a charged spare battery. Below are basic instructions for the satellite phone and VHF handheld.

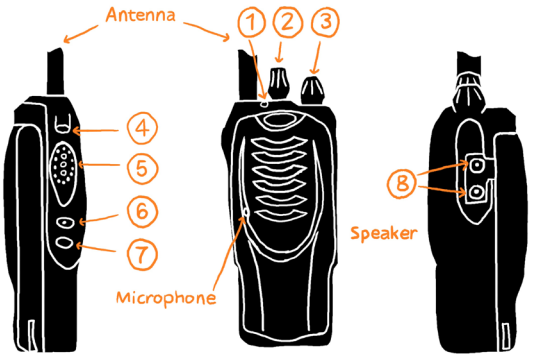
Iridium Satellite Phone

1. Attach the antenna by pressing the button on top of the unit and inserting the antenna. The antenna will be facing down in the back of the unit. It will click-in.
2. Rotate antenna up to either left or right, and fully extend. When talking on the phone, the antenna should be vertical to the ground. Make sure the antenna has a clear line to the sky.
3. Power the phone on by pressing the red button on the left of the keyboard.
4. The phone will start acquiring satellites and will show a signal strength. The phone is ready for use when the Iridium logo appears. For further information, refer to user manuals and/or quick start guides.
5. Phones are pre-programmed and come with a waterproof instruction card with speed dialing options. This will be completed by Alaska Operations staff based in Fairbanks prior to phones being sent to Toolik.
6. To call the Helicopter Coordinator simply press the #1 button and hold until the display reads "Helo Coord. Calling." If the Coordinator is unable to take your call, stay on the line and leave a voicemail stating your name, time of call, and message. If you want the coordinator to return your call, provide a call back time or state that you will leave your phone on for a certain period of time. The coordinator's phone is connected to a beeper. It will take approximately 15 minutes for the message to activate the beeper.
7. The battery should provide up to 20 hours of standby time and 2 hours of talk time at room temperature. The battery will lose about 1% of its charge per day. Be aware, results vary for countless reasons, but these times remain an accurate reference to the real-world expectation.

VHF Handheld

1. **Led Indicator:** Lights red while transmitting.
2. **Channel Switch:** Rotate to select channel 1-16. At Toolik, use channel 1 for line-of-sight use and channel 2 for off the repeater. The party you are talking to must be on the same channel.
3. **Power Switch/Volume Control:** Turn clockwise to switch ON the transceiver. Rotate to adjust the volume. To switch OFF the transceiver, turn counterclockwise fully.
4. **AUX Key:** This is a Programmable Function (PF) key.
5. **Push to Talk (PTT) Switch:** Press this switch, then speak into the microphone to call a station.
6. **Side Key 1**: These are PF Keys
7. **Side Key 2:** These are PF keys.
8. **SP/MIC Jacks:** Connect an optional speaker/microphone here.

Switching Power ON/OFF: Turn off the power switch/volume control clockwise to switch the transceiver to ON. Turn the power switch/volume control counterclockwise to switch the transceiver OFF.



Adjusting the Volume:
Rotate the power switch/volume control to adjust the volume. Clockwise increases the volume and counterclockwise decreases it.

Selecting a Channel: Rotate the channel switch to choose your desired channel from 1 to 16. Clockwise increases the number and counterclockwise decreases it. Again, for Toolik, use channel 1 or 2. If a channel has not been programmed, it cannot be used. When a non-programmed channel is selected, the LED indicator flashes red and orange and an alert tone sound. For further information, refer to user manuals and/or quick start guides.

Making a Call: Radio channel airtime is a shared resource for all users. Listen for any active voice traffic and avoid interrupting unless there is an emergency. Speak clearly and be concise whenever possible. When the radio channel is clear, lift the microphone 1.5-2 inches from your mouth, press and hold the PTT button and speak in your normal speaking tone. Release the PTT button when done talking and listen for a response on the channel.

In-flight Emergency

In the event of a flight emergency:

- The pilot will state there is an emergency
- Ensure your seatbelt is snug
- Do not talk unless instructed
- Secure any loose gear
- The person in front, left seat should keep clear of all instruments
- Note emergency exits
- Follow pilots instructions

Emergency Landing

The pilot will state there will be an emergency landing. Follow instructions as in an in-flight emergency with the addition of the following:

- Assume a crash position.
- Establish a reference point that you can grasp with your hand, such as the left or right side of your seat or handhold.
- Have toes directly under your knees and lower legs at an angle.
- Do not exit the aircraft until all motion has ceased.

Aircraft Crash or Ditching

The following is excerpted with permission from LTR training Systems. For more information, refer to www.survivaltraining.com

> During a crash or ditching, initially it will be every person for themselves in escaping from a burning or sinking aircraft. Survival may depend on one's ability to protect him/herself from an incapacitating injury, and to then organize thought processes quickly toward egress and survival. All activities must be controlled and focused quickly on what is essential and what is not.
>
> Crash or ditching victims frequently receive blows to the head which either daze or render them unconscious, thus preventing their escape. Helmets, visors, and proper personal restraints have prevented head and facial injuries to many crash and ditching survivors by absorbing shocks. Improper use of personal restraints such as seat belts and shoulder harness can cause undue harm. Loose belts and harnesses, or prematurely unstrapping personal restraints prior to cessation of movement are points to be considered to prevent injury to persons on board the crashing or ditching aircraft. A properly adjusted belt offers

far more protection than a prematurely released belt and just holding on for dear life.

Pilots and passengers can be fatally injured by flying cargo and improperly stowed equipment or may be hampered in their egress or pinned inside the aircraft by shifting cargo. It is essential that all toolboxes, cargo, and equipment be adequately secured before each flight.

Aircraft have been known to roll over on land or sink partially, immediately after impact with water. However, many aircraft will float upside down with the cabin submerged for short periods of time due to buoyancy provided by internal fuel cells. With the cabin inverted, whether under water or not, problems of personnel egress become compounded, and panic is likely to occur.

In ditching scenarios, in-rushing water – the most frequently reported single problem – is the greatest deterrent to escape. It forces cabin occupants into the rear corners of the cabin, sometimes disorientating them so that emergency exits cannot be located in the underwater darkness. **Know where emergency exit releases are prior to going under water**, and have doors positioned or unlatched, as necessary.

The best way to reduce disorientation, confusion, the effects of in-rushing water, smoke and fire, incapacitating injuries, and the accompanying panic is to **remain securely strapped in your seat and to establish a reference point that you can grasp with your hand. Remain in your seat and maintain your reference point** until all violent aircraft movement ceases, the rotor has stopped turning and you are re-orientated. After you have gathered your wits and are orientated, unstrap and exit. If you are seated in the middle, use the person next to you as a reference point.

The next phase is opening exits and escape hatches. Impact to the aircraft may jam exits closed and familiarity with jettison handles and push out windows becomes crucial. If you try an exit three times and you are not out, **try another exit!** Do not waste time or resources attempting to use an exit that is non-viable.

If the pilot is incapacitated, the person in the left front seat should shut off the fuel and battery switch after all movements have ceased.

Some Things to Remember Are:

- Protect your head and neck
- Cover your face
- Toes directly under knees, lower legs at an angle
- Establish a reference point
- Hold position until motion stops and stabilizes
- Get out quickly, stay below smoke
- Assist others if safe to do so
- Treat injuries at a safe distance

Helicopter Did Not Pick Up?

- Inform the Helicopter Coordinator of a late pick up.
- Relay your position if it has changed since you were dropped off.
- If the helicopter cannot pick you up for an undetermined amount of time and you are too far to walk to Toolik on the road or trail safely, assess your resources: Food, water, clothing, and shelter. Stay together and do not move far from your position unless instructed to do so or if you are in danger.
- You will have regular check-in times with the Helicopter Coordinator; however, you may call any time as needed. Keep batteries to the satellite phone dry and warm. Take the spare battery out of the case and put it in a jacket or pants pocket.
- Choose a site to set up your shelter, preferably a flat, dry area. Put insulating material between you and the ground.
- Keep your gear dry.
- Collect all food and store it away from your camp.
- Keep yourself as dry and as warm as possible. Be aware of your surroundings, especially the weather and wildlife.
- How do you feel? How do the other people in your party feel? Stay calm.
- All efforts will be made to return you to Toolik safely and as soon as possible.

In The Event of an Emergency

- Take a few deep breaths.
- Call the Helicopter Coordinator.
- Phone numbers are listed on communication hardware.
- Be prepared to relay the nature of your emergency and your position.

Hypothermia

Hypothermia is when the body's core loses more heat than it can produce and retain. As the body cools, it restricts the blood vessels to the skin to prevent further heat loss. Further cooling produces shivering; the body's attempt to heat its core. Untreated, body functions gradually cease and death will result.

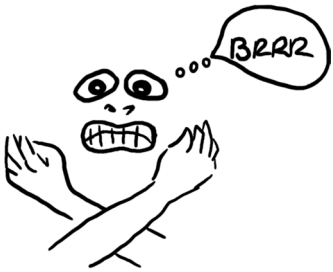
Hypothermia can occur any time when the body temperature is below 98.6 F. It is important to regulate your body temperature when doing strenuous work in cold or wet conditions by shedding layers as you sweat and adding layers when you cool down. Alcohol and drugs will increase your risk of hypothermia because they induce vasodilation, which increases blood flow to the skin and interferes with the body's shivering mechanism.

Hypothermia Prevention

- Be aware of the signs for hypothermia.
- Dress in layers and regulate your body temperature as it rises and falls by shedding layers or putting layers on.
- Stay hydrated with non-caffeinated and non-alcohol liquids.
- Eat high energy foods such as GORP or energy bars.
- Stay dry, conductive heat loss through direct contact with objects will increase 5 times with wet clothing. Water will conduct heat away from the body 25 times faster than air.

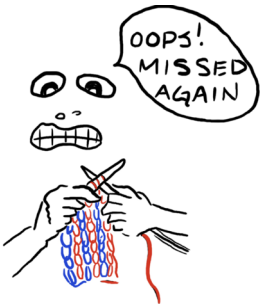
Three Stages of Hypothermia

Mild Hypothermia



Core Temp, 98.6°F - 96°F

- Extremities are cold
- Shivering begins
- Shivering can be stopped voluntarily



Core Temp, 95°F – 93°F

- Cannot do complex motor functions
- Cannot count backwards accurately

Moderate Hypothermia

Core Temp, 95°F – 93°F

- Intense shivering
- Mild confusion
- Unable to walk a 30ft straight line

Core Temp, 93°F – 90°F

- Difficulty speaking
- Sluggish, stumbles, motor skills are slow
- Irrational behavior. Becomes withdrawn

Severe Hypothermia

Core Temp, 90°F – 86°F

- Shivering sporadic, eventually stops
- Exposed skin blue and puffy
- Confused and irrational behavior

Core Temp, 86°F – 75°F

- Muscle rigidity, slow pulse
- Patient loses consciousness
- Body functions gradually cease

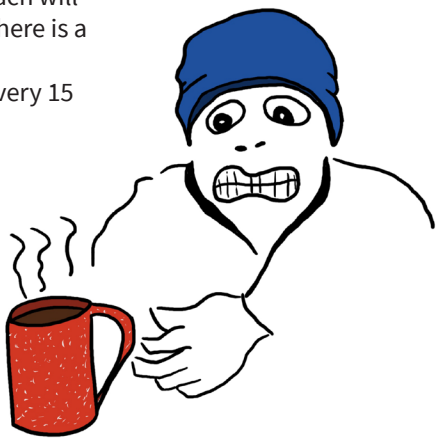
Treating Hypothermia

Mild Cases:

- Do not suppress shivering
- Change into dry clothes
- Increase activity to help keep warm
- Remember to keep the body dry if the patient starts to sweat
- Get into a shelter or protected area
- Insulate patient from the ground
- Give warm fluids and foods such as GORP, raisins and energy bars
- Do not give alcohol or stimulants like coffee or soda
- Most people will respond within an hour
- Monitor and call for help if condition does not improve or deteriorates or if the patient becomes confused

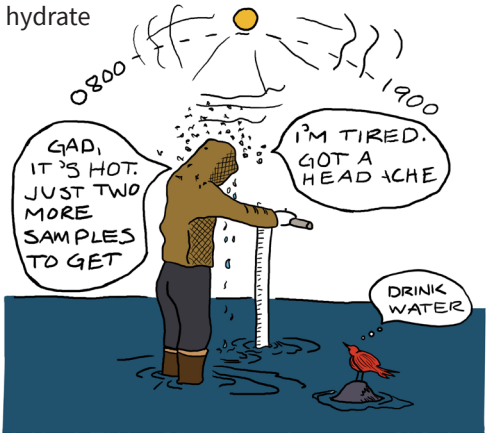
Moderate and Severe Cases:

- Call for help and start treatment immediately
- Handle patient carefully
- Treatment is the same as for mild cases with the following exceptions:
- Do not give solid food. The stomach will not be able to digest food, thus there is a high risk of vomiting
- Give warm sugar water diluted every 15 minutes
- There is a risk of cardiac arrest so do not massage the trunk or extremities
- Keep physical activities to a minimum
- Recognize the patient could become violent
- Continue to assess and monitor the cardiovascular status



Heat Exhaustion

Heat exhaustion happens when you are heat stressed and do not drink enough water. This leads to salt depletion which occurs when you attempt to hydrate without replenishing lost salt from sweating.



Symptoms include muscle cramps, dizziness, lightheadedness, headache, dark urine, nausea, vomiting, weakness, malaise, mild disorientation, and clumsiness.

Drinking water and rehydration fluids periodically helps prevent heat exhaustion.

Treatment For Heat Exhaustion

It is important to treat heat exhaustion because it can develop into heat stroke which is a life-threatening condition.

- Get the patient out of the sun
- Remove excess or tight-fitting clothes and cool the patient down by sponging with water. Put a wet compress on the forehead
- Fan the patient and keep cool. If patient begins to shiver, stop fanning and sponging
- Provide diluted rehydration liquids to the patient if they are alert and not nauseated
- Most people will show signs of improvement within 30 minutes
- Alert the Helicopter Coordinator or Toolik EMT if you are treating someone for heat exhaustion. It is best to have transportation available if the patient does not recover in a reasonable amount of time

Wildlife

There is an abundance of wildlife in and around Toolik Field Station. It is important to be aware of the types of animals and fowl in the area and respect their habitat.

People are mostly concerned with a bear encounter; however other animals could be a risk if surprised or threatened. It is best to view wildlife from a safe distance outside of the animal's "safe zone." What is this "safe zone?" If you are approaching an animal and it notices you or has moved to avoid your presence, that would be an indication you are too close.

The following is information taken from the Alaska Department of Fish and Game website. There are many other web resources with information about bears and other wildlife in the area. This manual provides only basic information about bears and moose.

Bear Safety

Knowledge of bear behavior helps prepare a person in the event of a confrontation. Do not panic if you see a bear and the bear eyes you intently. The animal is surveying the situation, trying to identify what sort of creature it has encountered, and whether it might be in danger. Once the bear realizes it has happened upon a person, the bear usually moves off to more important things – the daily business of foraging for food.

Close Encounters, What to Do:

If you see a bear, avoid it if you can. Give the bear every opportunity to avoid you. If you encounter a bear at close distance, remain calm. Attacks are rare; however, they do happen. Most bears are interested only in protecting food, cubs, or their personal space. Once the threat is removed, they will move on. Remember the following:

Identify Yourself: Let the bear know you are human. Talk to the bear in a normal voice. Wave your arms. Help the bear recognize you. If a bear cannot tell what you are, it may come closer or stand on its hind legs to get a better look or smell. A standing bear is usually curious, not threatening. You may try to back away slowly diagonally, but if the bear follows, stop, and hold your ground.

Do not Run: You cannot outrun a bear. They have been clocked at speeds up to 35 MPH, and like dogs, they will chase fleeing animals. Bears often make bluff charges, sometimes within 10ft of their adversary, without making contact. Continue waving your arms and talking to the bear. If the bear gets too close, raise your voice and be more aggressive as needed. Use noise makers when walking. Never imitate bear sounds or make a high-pitch squeal.

If Attacked: If a bear actually makes contact, you have two choices, play dead or fight back. The best choice depends on whether the bear is reacting defensively or seeking food. Play dead if a grizzly bear attacks you, you encounter a carcass, or any female bear that is protecting cubs. Lie flat on your stomach or curl up in a ball with your hands behind your neck. Typically, a bear will break off its attack once it feels the threat has been eliminated. Remain motionless for as long as possible. If you move and the bear sees or hears you, it may return and renew its attack. Rarely, lone black bears or grizzlies may perceive a person as potential food. Fight any bear that follows you or breaks into a tent or building if your personal safety or that of others is in jeopardy.

Defensive aerosol sprays which contain capsicum (red pepper extract) have been used with reasonable success for protection against bears. These sprays may be effective at a range of 6-8 yards. If discharged upwind or in a vehicle, they can disable the user. Take appropriate precautions. If you carry bear spray, keep it handy and know how to use it.

In Summary

- Avoid surprising bears at a close distance, look for signs of bears and make plenty of noise.
- Avoid crowding bears; respect their personal space.
- Avoid attracting bears through improper handling of food or garbage.
- Plan ahead, stay calm, identify yourself, do not run.
- In most cases, bears are not a threat, but they do deserve your respect and attention. When traveling in bear country, keep alert and enjoy the opportunity to see these magnificent animals in their natural environment.

Moose Behavior

Moose are usually not aggressive. They can be aggressive when hungry or when they become agitated, especially during mating season. Mothers and calves will protect their young if you approach too closely.

Moose have poor eyesight, but acute hearing and sense of smell. Moose are also good swimmers and can sustain a speed of 6 MPH and run up to 35 MPH. They are mostly active at dawn and dusk.

If you observe the long hairs on the moose's hump become raised and its ears laid back, beware of a charge. They may also lick their lips and will often kick forward with their front hooves. If they charge, run. Moose are territorial animals and will normally only chase you a short distance.

Sources

Alaska Department of Fish and Game, www.wildlife.alaska.gov

Cyril Shokoples, "Helicopter Safety for Outdoor Leaders and Guides"

Alaska Department of Transportation, www.dot.state.ak.us

James A. Wilkerson, MD, "Medicine for Mountaineering" 5th Edition, 2001, Pages 259-265, 278-281

Kenwood Corporation, "Instruction Manual for VHF Transceiver"

National Park Service, www.nps.gov

Office of Aircraft Services, "Basic Aviation Safety, Revised April 1997"

SRI International, "Instruction Manual for Motorola 9500 and 9509 Iridium Satellite Service"

Phone Numbers

Camp EMT: 907.455.2516

Ambulance: 907.474.2516 (EMT/Manager will either be driving folks to Prudhoe Bay or contacting Troopers/MEDEVAC to remove someone)

Police: Coldfoot State Trooper Office: 907.678.5211, Dispatch: 907.451.5100

Toolik Shift Manager: 907.455.2511

Station Manager: 907.455.2511

Prudhoe Bay Clinic (East): 907.659.5239

Pump Station 3: 907.450.4307

Pump Station 4: 907.450.4416

Battelle ARO Fairbanks Office: 907.455.4214

NOTES

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Toolik Helicopter Support Survey

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