

Mechanized Platforms



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Unit 24: Overview of ATVs, Mountain Bikes, Snowmobiles/Snowmachines, and Helicopters in SAR.

Date Last Updated: February 19, 2020

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Not Traveling on Foot

- Helicopters
 - Helicopter Operations
 - Helicopter safety, PPE
 - Landing zone
 - Flight safety
 - Air observer
- Mountain Bikes
- ATVs
- Snowmobiles



A variety of mechanized platforms can be used in inland SAR. We'll give an overview here.

Helicopter Operations

Locate, Access, Stabilize, Transport

- Search
- Rescuer Transport
- Medivac
- Helicopter Rescue
 - Hoist Rescue
 - Short haul



RICSAR K9 Jep, UH-60 Black Hawk Familiarization
RI National Guard, public domain image by Staff Sgt. Peter Ramaglia



Helicopters can be used at any phase in LAST.

They can be used to transport searchers or rescuers.

They can be used as search platforms (most common use in search in MA – MSP air wing providing aerial platform for FLIR).

They can be used for medical evacuation.

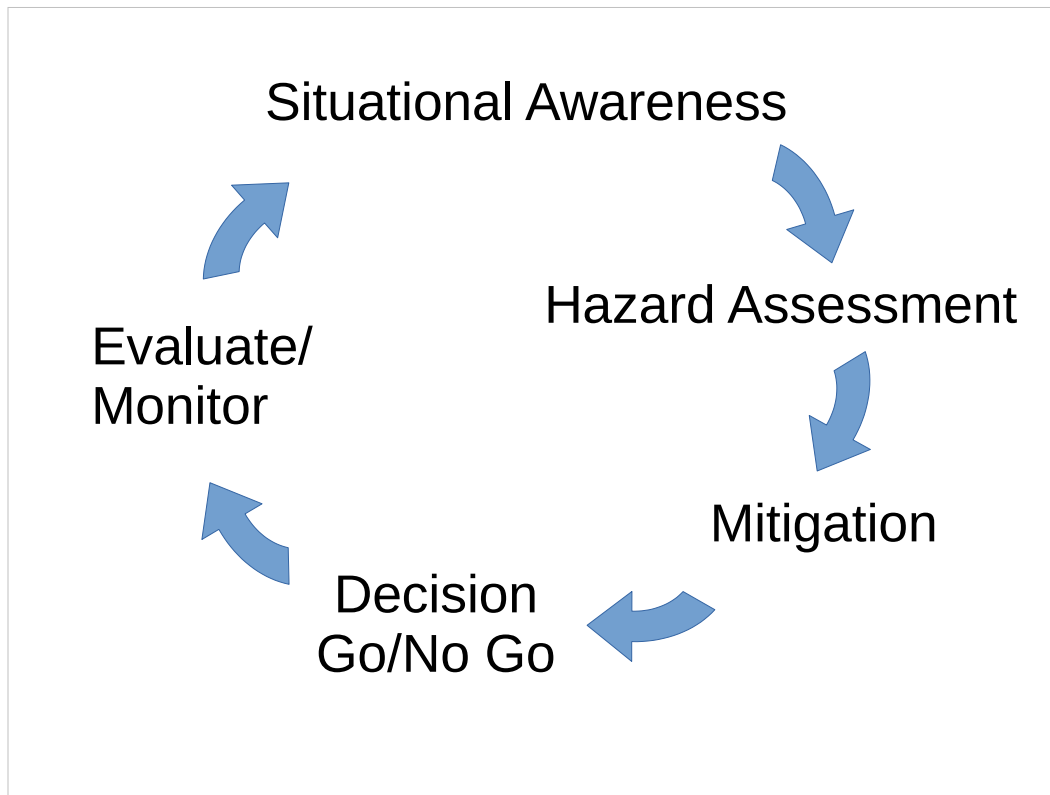
They can be used (if properly equipped and certified) to perform some types of rescue operations.

Helicopter rescue involves unique hazards, which can be fatal



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Helicopters come with substantial risks



And with hazards needs to come a systematic approach to assess those hazards, the ability to mitigate them, and a weighing of risk and benefit in a go/no-go decision: e.g. following the Cyclical Risk Management Process.

AFRCC Mission Go/No Go Criteria

Threat to Life, Limb, Eyesight, or Undue Suffering



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Helicopters aren't used lightly.

Helicopters can be used for lots of things, that doesn't mean they should be.

Recognizing the risks inherent in Helicopter operations, the AFRCC includes an assessment of the benefit in the go/no-go criteria for helicopter use. Benefit must be that using the helicopter can reduce a threat to life, limb, eyesight or undue suffering.

Characteristics of Safe Operations

- Well briefed
- Clear desired result
- Clear team expectations
- Clear responsibilities
- Climate that values input
- Identification of available resources
- Positive attitude, high morale
- High degree of accountability at all levels
- Atmosphere of self critique



Let's think for a bit about what makes for safe operations. [Discussion].

What happens when an operation is not well briefed?
When clear objectives aren't expressed?
When there aren't clear expectations on each team?
When there aren't clear responsibilities?
When there isn't awareness of available resources?

What happens when the climate doesn't value input?
When people have a negative attitude or low morale?
When there is no accountability?

What happens when we aren't willing to critique ourselves?

How do these characteristics of safe operations relate to the cyclical risk management process?

Typical Daytime Limitations

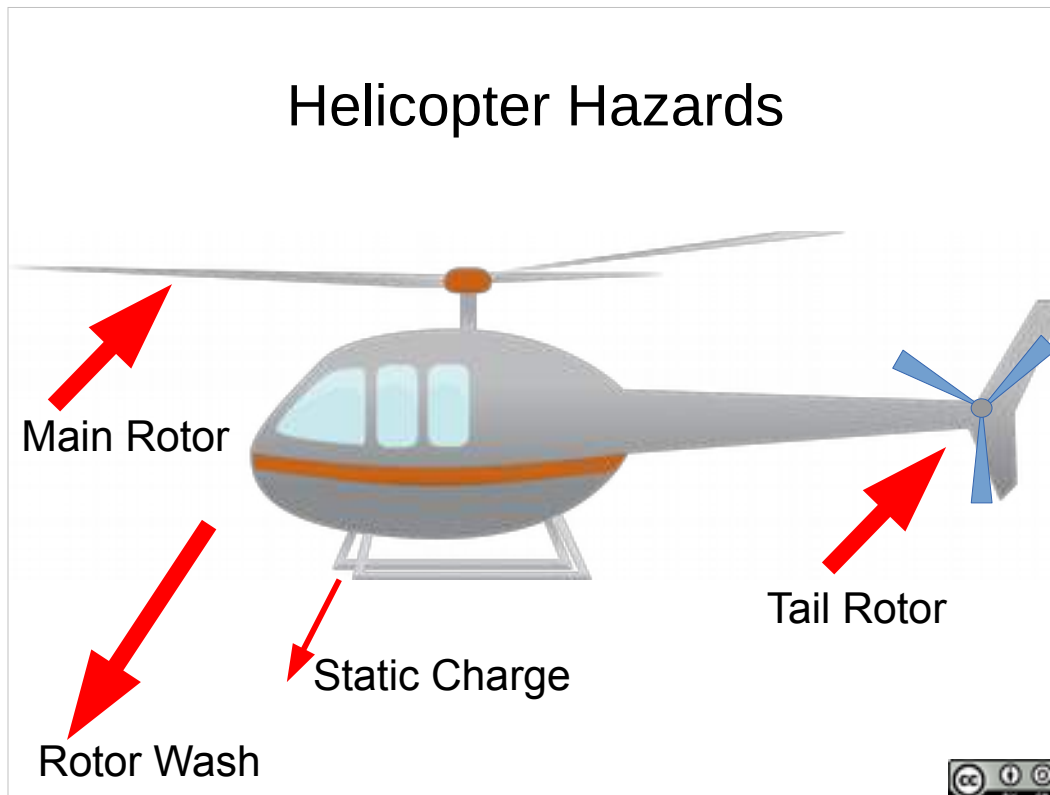
- One Mile forward visibility
- 500 feet clearance below a cloud ceiling
- 1000 feet above clouds
- 2000 feet horizontal clearance from clouds

- The final authority regarding any aircraft is always the Pilot In Charge.



Back to helicopters.

Helicopters are limited by the weather. If the weather isn't good, don't be surprised if they won't fly a mission.



Working around helicopters is hazardous.

Four of the hazards posed by helicopters are:

The rotor wash (blow stuff into your eyes)

The main rotor and tail rotor.

Helicopters develop a static charge. Forming a circuit between the helicopter and the ground can deliver a very large shock.







Landing zones are dangerous

Helicopters stay up by forcing air down with their rotors.

Lots of air.

Landing Zone Safety

- Secure loose clothing and equipment.
- Keep landing areas clear of loose debris.
- Provide visual wind indicators for landing and takeoff.
- Wear eye and hearing protection. Wear a helmet secured by a chin strap.



The rotor wash will blow things around on landing and take off – moving lots of air.

Keep the landing area clear of debris.

Keep your own clothing and equipment secured.

Wear hearing and eye protection and a helmet.

The pilot needs to know what the wind is doing:
Provide an indicator of the wind (large flagging tape streamers...)



Here's a signal that can be used to indicate the wind direction.

Stand upwind of the landing zone. Face the landing zone, extend your arms to point with the wind into the landing zone.

At night, shine headlights onto the landing zone.

Landing zone/Helispot

- Preferably: pre-planned landing zone, with ground support from local fire department.
- Check and clear the area of FOD – Foreign Object Debris.
- At night, illuminate helispot with lights shining onto the ground (not strobes).
- No Flares, No Smoking, No ignition sources.
- Site clear of overhead wires, towers, obstructions. Site clear of all obstacles taller than 12 inches. Site with less than 7 degree grade.



Landing zones are usually pre-planned and known to the local fire department and or PSAP (dispatch center).

Check and clear the area of
FOD – Foreign Object Debris



Landing Zone Safety - Approach

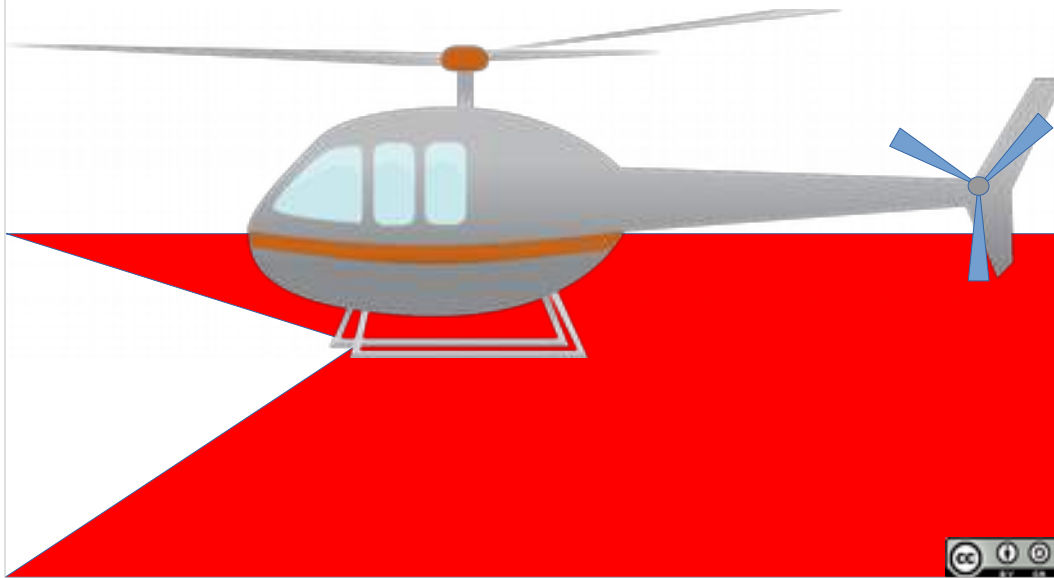
- Never approach the helicopter until the pilot or crew directs you to do so.
- Approach and depart from front or with 45° of the front of the helicopter, unless directed otherwise.
- Approach crouching, in full view of the pilot.
- Do not walk toward the tail rotor.
- Approach from downhill side, depart downhill.
- Carry nothing above shoulder level.



Only approach a helicopter under the direction of the crew.

Carry nothing above the shoulder level.

Only Approach on the Crew's Signal
Usually from the front



Remain at least 150 feet away from the Helicopter.

Only approach under the crew's direction.

Medical helicopters may load from the rear. Only approach with an escort by a crew member. Why? You don't want body parts chopped off by the tail rotor....

Only Approach on the Crew's Signal



NE Regional Medical Helicopters (e.g. Boston MedFlight)



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Landing

- Preferred: Full touchdown, flat landing zone clear of obstructions
- Slope landing: Up to 5 degree slope. Risk of striking tail on slope. Risk of dynamic rollover.
- Power on landing: Both skids on ground, running full power. Snow landings, landings next to drop off.
- One Skid landing, Toe-in landing.
- Hover Landing: Skids don't touch the ground, aircraft can move.



Preferred landing is on a flat landing zone clear of obstructions.

Landing in other conditions may be possible, but comes with increased hazards.

Slopes

- Approach and depart from front or with 45° of the front of the helicopter.
- Approach from the down slope side of the helicopter.
- Depart the helicopter going down hill.



Approaching or leaving a helicopter on sloping ground
– do so on the downhill side.

Only approach or depart from within 45 degrees of the front.

Flight safety

- Seatbelts fastened at all times.
- Secure all loads (packs, ropes, loose equipment) under the direction of the crew.
- Secure canines under the direction of the crew (rappelling harness, muzzle).

In flight, follow the directions of the crew.

Keep seatbelts fastened at all times.

Secure all loads (including canines) under the direction of the crew.

Required Pre-Flight Helicopter Safety Briefing

- Personal protective equipment (e.g. gloves, flight helmet, clothing)
- Approach and departure around aircraft
- Location of the first aid kit and any survival equipment
- Location and operation of the fire extinguisher, first aid kit and emergency location transmitter (ELT)
- Emergency electrical and fuel shutoff controls
- Operation of doors and seat belts
- Emergency procedures and exits

A crew member is required to give a safety briefing covering these points to all helicopter passengers.

ICS Helicopter Related Locations



Helibase:



Helispot:



There are two Helicopter related location under ICS:

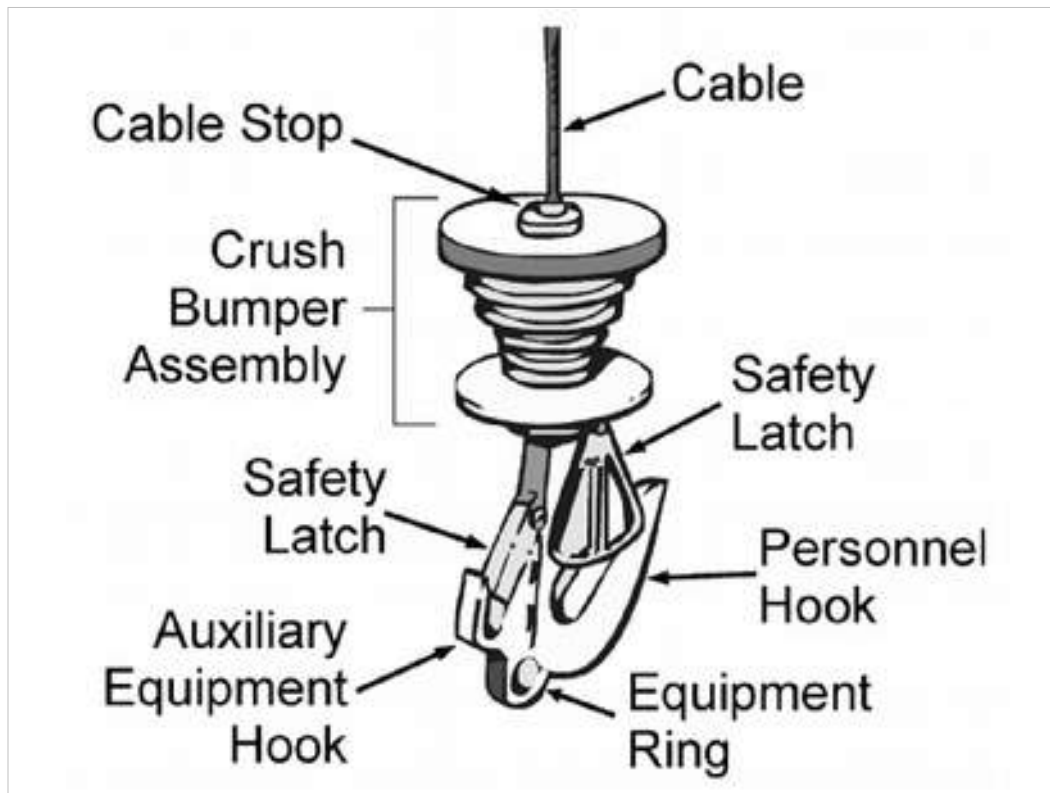
Helibase – a place where helicopters can land, be fueled and maintained.

Helispot – a place where helicopters can land.

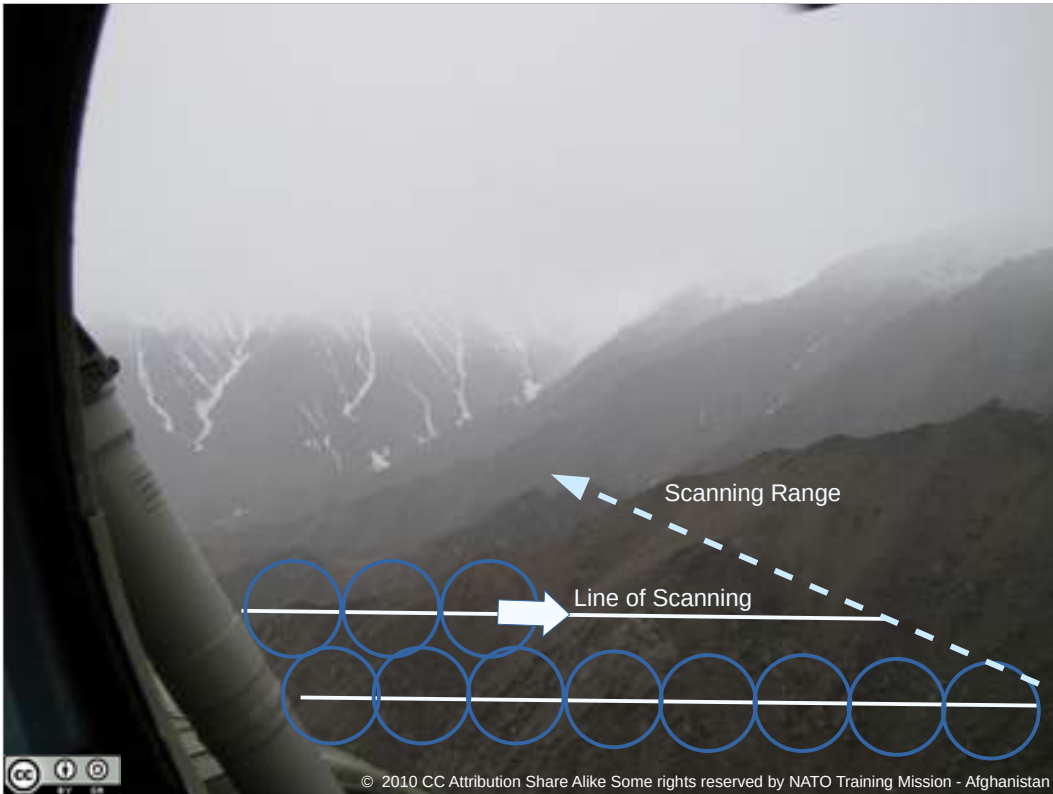
Most municipalities in MA will have pre-planned Helispots for medical helicopters known to the local fire department and to dispatchers.



Helicopters with appropriate equipment, certifications and trained crew can perform some rescue operations (vertical hoist between the ground and the helicopter; rarely short haul or long haul).



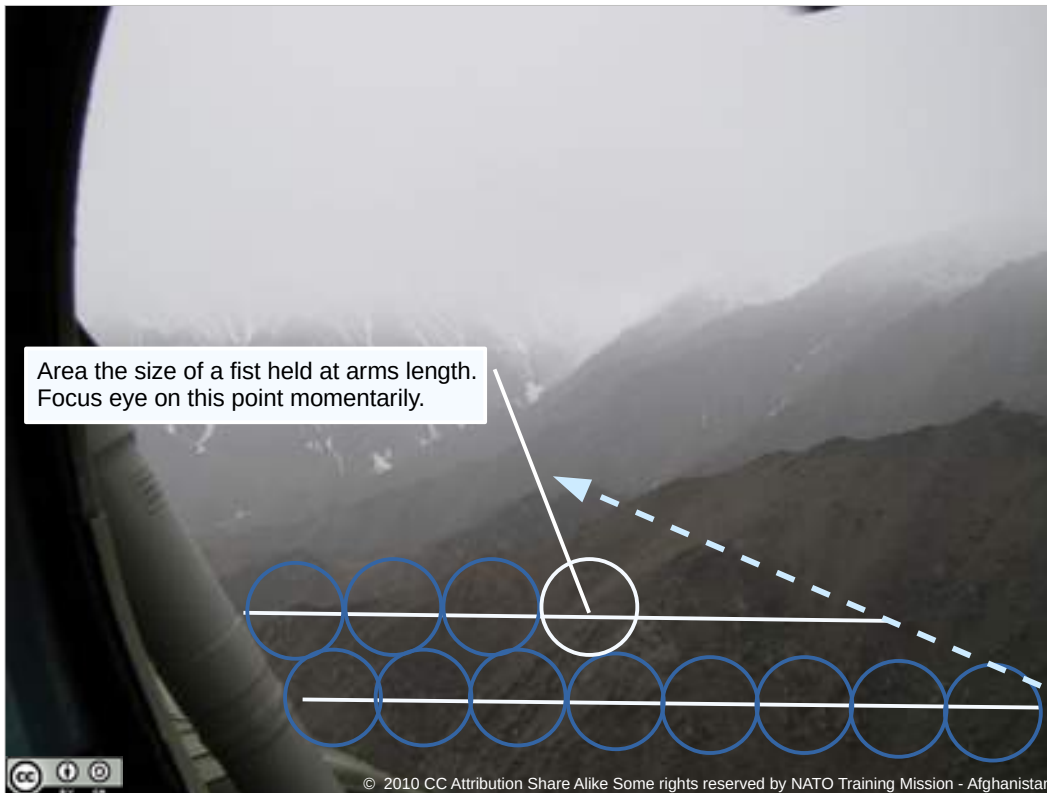
This is a typical helicopter rescue hook. Humans get hooked into the large hook (not the smaller auxiliary equipment hook or the equipment ring).



Helicopters can be used as aerial search platforms, as can other aircraft.

Air observers are trained to scan the ground in a systematic way.

Unlikely to be used as an air observer, but the technique is valuable for observing in search in general.



Hold a fist at arms length.

This is the size of the area you look at – focus the eye and your attention on this area momentarily

Don't scan your eyes across the landscape, look at one area, then move to the next, look there momentarily, then move to the next.

Looking on one side, work from the direction of travel backwards in a line, then move to the next line forward.

Time to complete one diagonal line is time it takes aircraft to advance one fist width.

Air Observing

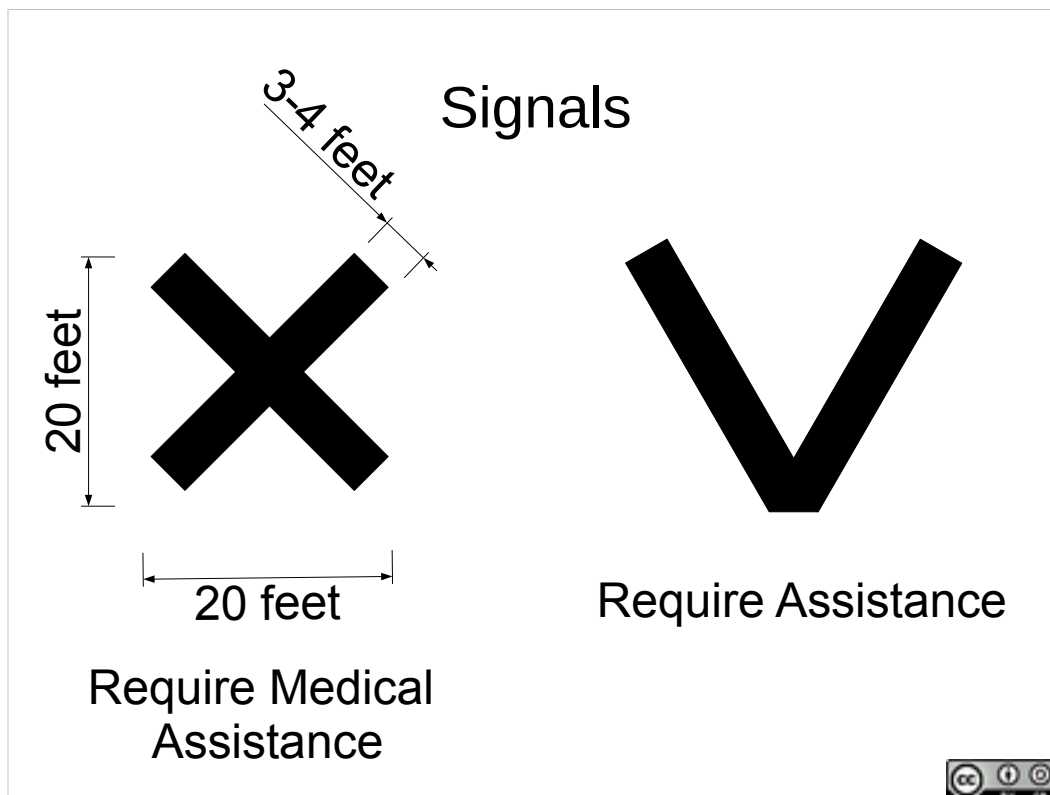
- Highly Fatiguing – limit to 2-3 hour sessions.
- On spotting something, point at it.
 - Note the position of the sighting with respect to landmarks.
 - Notify pilot.
 - Use clock positions to describe location of sighting.

Air observing is highly fatiguing – limit to 2 to 3 hours.

On spotting something, point at it (also standard practice for a person in distress in the water).

Tell the pilot (use clock positions, 12 o'clock straight ahead of aircraft, 3 o'clock straight off right side, 6 o'clock directly behind).

Note landmarks around the location.



Back to survival: STOP: Plan: first aid, Shelter, Fire, Signals

Two signals for ground to air signaling by persons in distress from Annex 12 to the Convention on International Civil Aviation.

Make as large as possible, preferred minimum size is 20' by 20' with width 1/5 to 1/6 of length.

Make as strongly contrasting with the background.

Make deep/tall to cast shadows if possible.

Place in the open, visible from the air, away from shadows.

Destroy after signal has served its purpose.

Audience: Aircraft.



Those are signals that you make in the ground in case an aircraft flies over – that is, prepared messages.

There are other body signals you can give to communicate in real time with an aircraft overhead in the absence of radio communications.

Here's one.

Stand still with one arm straight up in the air – signal that all is OK.

These signals, unlike the ground marking messages are recognized in the US, but are not international and are not specified in the Convention on International Civil Aviation.



Here's another.

Two forms of a signal to not land – waving both arms back and forth.

Waving both arms together from side to side is from a standard set of ground to air body signals.

Bringing the hands together overhead from the horizontal and back is from the set of Interagency Helicopter Hand Signals.

Mountain Bikes



How can bicycles be used in SAR?

Safety

- Trail riding isn't like riding on the street.
- Be Fit, Hydrate.
- Ride within your skill level. Stay in control of your bike.
- Wear PPE
- Yield to horses: Dismount, wait for them to pass
Talk with the riders, they may have seen the subject.
- Yield to other trail users (talk with them).

Despite the picture on the previous slide, mountain biking isn't like riding on pavement.

Terrain is irregular, there are hills, rocks, trees.

You need to be fit. You need to be competent on a mountain bike on trails.

You need PPE.

PPE

- Helmet
- Gloves
- Eye protection
- Appropriate footwear: without laces or keep laces tucked in.
- Layered clothing when cold.
- Suitable clothing for the conditions.
 - Consider protective clothing – padding for hips, elbows, shoulders.
 - Keep pants legs tucked in.

Key piece of PPE is the helmet:

But also, gloves, eye protection, clothing suitable for the weather (hot/cold/wet/dry) while doing episodic strenuous exercise.

Make sure that boot laces and pants can't get entangled in the chain.

Trail conditions may merit padding and protective clothing. Weather likewise.

Use in Search

- Rapid coverage of trails.
- Less clue destruction (physical and audible) than ATVs.
 - Stop and check for sign, particularly check track traps.
- Requires PPE
- Unlike horse, rider has to drive.



Mountain bikes are valuable tools for search.

Mountain bike teams can rapidly cover trail systems.

They are quieter and less destructive than ATVs.

Rider still has to operate the bike: Stop and check for sign, in particular check track traps.



ATVs can be used in SAR.

ATV

- Engine driven, primarily intended for off road travel.
- Definition and regulation varies by state, generally handlebars and a seat straddled by the rider.
- Independent suspension
- Rider Active – operation affected by position of the rider.
- Most are single rider only
 - If designed to carry passengers, requires: extra seat with back, extra footrests, bars for passenger to hold.



Definition of an ATV varies from state to state, engine driven, designed for off road use, usually have handlebars and a seat straddled by the rider, usually only one rider.

Unlike a car, they are Rider Active – handling and operation is affected by the position of the rider.

Safety

- Obtain specific training (**this isn't it**) before operating an ATV. It is a powerful, dangerous vehicle.
- PPE
- Inspection checklist before use (per owners manual).
- Know your limitations and stay within them.



Behave in their own sort of ways, thus require specific training (this isn't it) to operate.

PPE

- Helmet (meeting state requirements) with face shield or Helmet with shatter resistant goggles.
- Gloves – thick, padded knuckles
- Boots – above ankle, keep clothing tucked in, raised heels, rubber soles.
- Protective clothing – with kneepads, chest protector, padding for hips, elbows, shoulders. Legs: over the calf cut and abrasion resistant protection.
- Layered clothing when cold



ATVs require PPE.

ATV: Use In SAR

- Fast, can haul loads.
 - Logistic support for rescue operations
- Loud, destructive.
 - Stop to listen.
 - Stop to check for sign – particular attention to track traps
- Focus on Safety
- Interacting with mounted SAR:
 - Pull over, stop, turn off engine, remove helmet.



ATVs can be used in SAR operations.

Primary role: Logistic support.

They are loud and destructive.

When using in the Locate phase of a search and rescue operation:

Stop. Listen. Look.

Pay particular attention to tracktraps and check for sign.

If interacting with horses, pull over, stop, turn off engine, remove your helmet (so you look human to the horse).



Snowmobiles can also be used in SAR.

Safety

- Obtain specific training (this isn't it) in operation.



Like ATVs, Snowmobiles require specific training (and this isn't it).

Like ATVs, Snowmobiles require PPE.

Some specific hazards include: cold injuries, wetlands, streams (e.g. breaking through ice and falling into water), fence lines (e.g. decapitation), and vegetation (e.g. running into trees or tree limbs).

Snowmobile: Use in SAR

- Fast, effective cross country transport on snow.
- Loud
 - If in Locate phase, consider stopping regularly and moving away from the machine for sound sweeps.
- Destructive
 - Watch for Clues
 - Check choke points on travel routes carefully for sign.



Similar to ATVs, Snowmobiles can support SAR operations.

Good for logistic support and for travel over snow.

Like ATVs, loud and destructive.

When in the locate phase of a SAR operation:

Stop, Look, Listen.

Check for sign.

Particularly stop and check choke points on travel routes for sign.

Advantages/Disadvantages?

- Equine
- Mountain Bike
- ATV
- Snowmobile
- Foot

What are the advantages and disadvantages of these SAR platforms?

Discuss. **Some examples:**

Horses: Sensor itself. High vantage point. Rapid travel. High maintenance/training/care/feeding needs.

Mountain Bikes: Rapid travel, quiet, needs maintenance.

ATV/Snowmobile: Rapid, loud, destructive of sign, need maintenance, specialized training.



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