

FLIGHT FOR LIFE COLORADO Mountain Rescue Operations





Mountain Rescue Operations

Co-authored and edited by Charley Shimanski
Mountain Rescue Program Coordinator, Flight For Life® Colorado
Version 1.2 (March, 2018)

© 2018, Flight For Life Colorado; All rights reserved

COVER PHOTO:

Boulder's Rocky Mountain Rescue Group team members prepare to load a patient on Apache Peak.

Photo courtesy Mark Scott-Nash, Rocky Mountain Rescue Group.

All photos courtesy Flight For Life Colorado unless otherwise noted.

TABLE OF CONTENTS

INTRODUCTION	1
FLIGHT FOR LIFE COLORADO	
Flight For Life Helicopters	2
Flight For Life Helicopter Capabilities	3
PART 1 THE FLIGHT FOR LIFE MOUNTAIN RESCUE PROGRAM	
Levels of Response	4
PART 2 LIFT TICKET PROGRAM	
Lift Ticket Training Protocol	7
Activation of the Lift Ticket Program during a SAR Mission	9
“Modified” Lift Ticket	11
PART 3 AVALANCHE DEPLOYMENT PROGRAM	
The Team Players and Their Role in Avalanche Deployment	12
Avalanche Deployment: Three Phases	14
How the Avalanche Deployment Program Works	15
Other Rescue Equipment	17
Sequence for Avalanche Deployment Loading and Unloading	19
Other Key Points about Avalanche Deployment	22
PART 4 RESCUE DEPLOYMENT PROGRAM	
The Team Players and Their Role in Rescue Deployment	23
Rescue Deployment: Three Phases	24
How the Rescue Deployment Program Works	25
Key Elements of Rescue Deployment	27
Sequence for Rescue Deployment Loading and Unloading	27
A Footnote about the Rescue Deployment Program	27
PART 5 PROTOCOL FOR LOADING WHILE THE ROTORS ARE TURNING	28
PART 6 INTERFACE WITH COLORADO ARMY NATIONAL GUARD	
Capabilities	30
Flight For Life and COARNG Operations	30
PART 7 WINTER HELICOPTER OPERATIONS	
Landing Zones in Winter	31
Landing and Taking off in Snow	32
Approaching a Helicopter in Winter Operations	32
PART 8 GENERAL HELICOPTER SAFETY	
Doors, Belts and Helmets	33
Communication	35
Hand Signals at Helipads and Landing Zones	36
Emergency Procedures	37
CONCLUSION	
About Flight For Life Colorado	38
Acknowledgements	38
APPENDIX A HELICOPTER HAND SIGNALS	39

INTRODUCTION

Colorado has 104,427 square miles of terrain, 40 percent of which is mountainous. With Colorado's population growth, more and more backcountry users are exploring those mountains, resulting in an increased number of backcountry incidents and accidents.

As a result of these increases, Flight For Life® Colorado has joined with Colorado Sheriffs, search and rescue groups, and ski patrols to recognize the need to save time, energy and precious minutes during backcountry rescues. All share the desire to help those injured in the Colorado backcountry get the care they need and get it quickly, and Flight For Life has become an essential component of that effort.



Flight For Life's Lift Ticket, Avalanche Deployment and Rescue Deployment Programs have fulfilled an essential need to place rescuers at the scene of a rescue incident more quickly, saving lives in the process. Our Avalanche Deployment Program is a one-of-a-kind rescue program in the United States, and fills an important community need in Colorado, as our state leads the nation in fatalities caused by avalanches.

This Flight For Life Mountain Rescue Operations guidebook is intended to guide requesting agencies in the utilization of Flight For Life to assist on search and rescue (SAR) missions, and in our Lift Ticket, Avalanche Deployment and Rescue Deployment Programs. Every SAR mission is a dynamic scenario with developing complexities. It is, therefore, impossible to predict every incident. This material is intended to support the search and rescue community by providing guidelines that may assist in the decision-making process.

Flight for Life Colorado has 5 operating A-Star B3 helicopters with 22 pilots, and more than 70 flight nurses and paramedics. Our number one concern is the safety of all rescue personnel involved in these calls, and we hope this training material will help rescue professionals to constantly adapt to these difficult incidents with a "Safety First" mentality.

We thank you for your participation in the Flight for Life Colorado Mountain Rescue Program and look forward to working together to save lives in the Colorado backcountry.

A handwritten signature in black ink that reads "Kathleen Mayer". The signature is written in a cursive, flowing style.

Kathleen Mayer, RN
Program Director
Flight For Life Colorado

FLIGHT FOR LIFE COLORADO

Available 24 hours a day, Flight For Life Colorado air ambulance and critical care transport services may be requested by any physician, RN, ski patrol, ambulance service, fire department, law enforcement agency or search and rescue group. Its helicopters operate within a 120-mile radius of its Colorado operations bases.

A patient's ability to pay is never questioned when urgent medical transport is needed. Flight For Life Colorado provides resuscitation, stabilization and transport for patients across the lifespan.

The Flight For Life Colorado program has special linkages with several of Colorado's most respected specialty facilities and health care organizations. Children's Hospital Colorado, Kaiser Permanente, Fort Carson Army Base and several search and rescue groups all rely on Flight For Life Colorado's rapid, high-tech medical transport service. Although operated by Centura Health, Flight For Life Colorado



transports patients to any appropriate medical facility, based on the condition of the patient, the patient's request, and the request of the sending or receiving physicians.

FLIGHT FOR LIFE HELICOPTERS

Easily the most visible and recognizable vehicles of the Flight For Life fleet are the five distinctively painted orange Airbus "A-Star" B3/B3e helicopters. These aircraft are literally flying critical care units. Chosen for its high altitude capability and economy of operation, the A-Star B3/B3e is a perfect fit for medical air transport in Colorado's mountain communities and terrain.

The helicopters are based at St. Anthony Hospital in Lakewood ("Lifeguard One" or "LG1"), St. Anthony Summit Medical Center in Frisco ("Lifeguard Two" or "LG2"), Penrose-St. Francis Hospital in Colorado Springs ("Lifeguard Three" or "LG3"), St. Mary- Corwin Medical Center in Pueblo ("Lifeguard Four" or "LG4"), and Mercy Medical Center in Durango ("Lifeguard Five" or "LG5"). All of these helicopters are in service 24 hours a day, seven days a week.

They have a service radius of approximately 120 miles from their bases.

Note that the term "Lifeguard One" does not refer to a specific aircraft with a specific tail number ("N number"). Rather, the name "Lifeguard One" refers to whichever helicopter is operating out of St. Anthony Hospital in Lakewood on that day. Similarly, "Lifeguard Two" refers to whichever helicopter is operating out of Summit Medical Center on that day, and so on.

Many of the Flight For Life pilots have military experience, some having seen combat in Vietnam and Desert Storm. All have several thousand hours experience as pilot-in-command and have undergone extensive training to enable them to fly in the unique environment of the Rocky Mountains.

FLIGHT FOR LIFE HELICOPTER CAPABILITIES

Each helicopter is capable of carrying one adult patient and two care providers, in addition to the pilot. It is Flight For Life's policy not to carry family members aboard the helicopters.

The helicopters are used in two primary roles—scene response and interfacility transport.

1. **A scene response** can be to an urban traffic collision, a medical emergency with ambulance response, an accident involving traumatic injury, or a backcountry rescue.
2. **Interfacility transports** are performed in order to move a patient quickly either to a higher level of care or for the sake of immediate intervention.

Safety and Dynamics

The pilot's chief responsibility is the safe operation of the aircraft. Each scene is evaluated for its level of risk, and a flight may be aborted by any crewmember if they feel uneasy. Loading and unloading must be accomplished with both skids solidly on the ground. Factors such as weather, temperature and winds can rapidly change the performance capabilities of helicopters. As such, Flight For Life responses are very dynamic. Plans developed and initiated may have to be modified numerous times during the course of the response.

All Flight For Life helicopter operations are under "visual flight rules" (VFR), so weather factors will significantly affect a pilot's decision-making, including whether or not to fly at all.

NIGHT VISION GOGGLES

Since Flight For Life's five helicopters operate 24-hours a day, its pilots and medical crewmembers are trained in the use of night vision goggles (NVGs). This ability to utilize NVGs is a tremendous asset as crewmembers may be able to locate light sources as simple as a cell phone from miles away.

The use of NVGs by medical and flight crewmembers also adds a significant safety margin, particularly when flying in mountainous terrain. Flight For Life was one of the first air medical programs in the country to equip its helicopter with this technology.

NVGs work by amplifying ambient light up to 3,500 times; that image is visible to the user in the form of a green, binocular field of view of 40-60 degrees. The image is without magnification, and the narrow



NVG imagery showing the Colorado Army National Guard team performing night hoist training with Mountain Rescue Aspen at the Eagle, CO airport.

Photo courtesy Chris Carr, Flight For Life Paramedic

field of view allows for peripheral vision to remain intact so the user can form a complete picture of their surroundings. It is important to note, however, that NVGs do not enable the pilots to fly in weather conditions that they would not fly in unaided. (NVGs cannot "see through" clouds, snow, etc.) NVGs are just one tool—and are not a "cure-all" for night operations.

Flight For Life Medical Crewmember Capabilities

The Flight For Life medical crew will not act as a SAR team, but will work within its defined parameters for patient care and evacuation.

Additionally, each member must meet a fitness standard every six months to maintain physical abilities, and participate in annual survival training in austere environments.

PART 1 | THE FLIGHT FOR LIFE MOUNTAIN RESCUE PROGRAM

Flight For Life has worked closely with mountain rescue groups in its response area since 1972 and greatly values the service provided by the dedicated groups of volunteer professional rescuers. Within operating guidelines, its resources are made available in any way possible. All helicopters and pilots are chosen specifically for specifically for the highest performance and level of safety in the very challenging environments and altitudes of the Colorado Rocky Mountains all year long.

Safety FIRST!!!

This guide has been created to increase safety in the execution of SAR operations using Flight For Life's helicopters. Helicopter operations include an element of risk, especially in austere environments, and a study of rescue accidents in U.S. indicates that rescuers are more likely to be killed in an aviation-related accident than by all other means combined. Nearly every year, rescuers die or are seriously injured in helicopter-related SAR incidents.

Understanding, standardizing and reducing risk is EVERYBODY's responsibility, and this material is designed to be a tool to help all involved.

LEVELS OF RESPONSE

There are several levels of response by Flight For Life's helicopter program. These include:

- Scene Call
- Standby
- Airborne Standby
- Search and Rescue "Recon" Flights
- Immediate "GO"

Scene Call

Since 1972, Flight For Life has assisted agencies with "scene calls." A typical scene call requires Flight For Life to assist in the care and evacuation of patients. It is important to keep in mind that Flight For Life can be used in conjunction with local Emergency Management Services (EMS) and SAR agencies, whether they are on scene or not. The key

benefit of utilizing the helicopter is that it allows for more rapid extrication when time is important or terrain is difficult.

When Flight For Life arrives on a scene prior to SAR personnel, an initial assessment of the situation is made by the pilot and medical crewmembers. It is then determined whether further assistance will be needed in the rescue. This information will then be relayed to the requesting Agency Having Jurisdiction (AHJ), which is usually the County Sheriff. Once this message is relayed, a plan for patient access and extrication can be made. This may involve waiting for ground SAR members to arrive or using the Flight for Life Avalanche Deployment, Rescue Deployment, or Lift Ticket program to shuttle in additional resources.

A Flight For Life medical crew may land at a designated landing zone (LZ) and then be transported to the accident site by SAR on snowmobile, ATV, 4x4 vehicle, snowcat, or hiking to assist in patient care.

All Flight For Life crewmembers have warm clothing and gear and are in the capable care of SAR to assist if it becomes an extended rescue. It is the policy of Flight For Life to try and keep the medical crew together. Unless there is a specific need for a SAR paramedic, Flight For Life will utilize its own flight paramedic or flight nurse for these calls.

Often SAR is looking at long and difficult ground evacuations, encroaching darkness, or bad weather. The helicopter can safely transport less critical patients to local or appropriate medical facilities, save time, and reduce the risk of injury and exposure to SAR team members. Some examples may be isolated orthopedic injuries or moderate medical problems where these patients need to be treated but are not critical.

Standby

Every day, the Flight For Life Communications Center (*aka* "Comm Center") receives numerous requests from EMS agencies for the aircraft and crew to "Standby" while more information about a patient's

condition is gathered. SAR or EMS agencies may receive a call of a “possible” avalanche burial or “there may be a medical or trauma emergency” but there is not enough information to launch the Flight For Life helicopter. In this case, a standby is requested.

A standby for Flight For Life serves two important functions:

- First, it gives the Flight For Life crew information that may be critical to the decision-making process. There are five Flight For Life helicopters that may be utilized for a standby. If the helicopter requested is not available, then the next closest helicopter will be placed on standby. In this case, response time may be extended or the flight might not be possible at all. Based on information received, or additional info, this could change a request to an “Airborne Standby” or an “Immediate GO” (described below).
- Secondly, it allows the Flight For Life pilot and crew to begin to prepare for a possible SAR call. The crew will check weather, load the avalanche transceivers and RECCO detector, and prepare equipment. As a result, preparation for the flight is already taking place. There is no cost to perform a standby and the helicopter does not power up until more information is received.

Airborne Standby

An “Airborne Standby” is another tool utilized by EMS agencies and has proven to be effective. In this scenario, there is enough information to launch the aircraft and get it headed towards the scene or general area or the location of the Avalanche Deployment Team. If the call becomes a “GO,” critical time is saved. If more information is obtained and it is determined that Flight For Life is not needed, then the aircraft will stand down and return to base. This is NOT considered a waste of resources and may prove to be beneficial in time-critical missions.

Search and Rescue “Recon Flights”

As Flight For Life Colorado continues to expand its support and increase its call volume with SAR agencies across the state, it has identified the need for “Recon Flights” on most of these calls. Primarily, Recon Flights add one more important safety step and allow the pilot and crew the opportunity to quickly assess the scene before the mission is running at full speed. These Recon Flights can apply to backcountry scene calls, SAR assists, and Lift Ticket calls. Generally, they do not apply to Avalanche Deployments, since Avalanche Deployments are generally a known incident at a known location.

Often the Recon Flight is necessary to obtain an accurate location of the patient. Once located, the pilot can determine what the performance capabilities of the aircraft are, where suitable LZs are, and the crew can then together determine the safest utilization of the aircraft for that particular call.

Typically, Flight For Life will receive the call and fly to the scene or a staging area. If, during a Recon Flight, the pilot can safely land close to the patient and if there are no environmental dangers and no need for extrication, Flight For Life can handle the call without assistance from SAR. This should only be considered with the authorization of the AHJ—usually the County Sheriff.

Once information acquired during a Recon Flight is communicated to SAR Incident Command, the Recon Flight gives all involved the critical information necessary to develop a plan. Information is gained to assist the Incident Command team on issues such as safe ground routes into and out of the scene, number of personnel needed, number of personnel Flight For Life can carry per flight, equipment needed, amount of equipment Flight For Life can haul, and fuel constraints.

If there are environmental dangers or extrication issues, then Flight For Life will work with the AHJ and SAR team to determine the best course of action to get the qualified individuals to the scene.

If it is already known that there will be environmental dangers or extrication needed, and Flight For Life is launched and directed to a staging area, then Flight For Life would still attempt to do a Recon Flight of the scene before landing at the staging area. This would be done as long as the scene is within a reasonable distance from the staging area so as not to delay or adversely affect the response time. This will allow the pilot to accurately assess the scene area and determine the helicopter capabilities for that call before he has loaded SAR personnel and gear on board.

Flight For Life is occasionally used in a search for a lost or injured person by transporting searchers and assisting in the aerial elements of the search. Helicopters are most effective searching wide open areas and difficult terrain such as cliff bottoms and other areas that ground teams will have trouble traversing. Searching areas with tall trees and heavy brush are where helicopters will be least effective. An accurate description of the clothing and equipment for the lost person will greatly assist aerial search.

Immediate “Go”

This type of scenario involves more complete information where it is more certain that Flight For Life is needed. In an Avalanche Deployment, Flight For Life’s aircraft will proceed to the nearest complete ski patrol dog team or another location determined by SAR team Incident Command, and take them directly to the scene of the burial, as time is critical. If it is a Lift Ticket mission, then refer to “Part 3 | Lift Ticket.”

Decision-Making Relative to Weight on Board the Helicopter

During the first couple of flights of any Flight For Life response, the Incident Commander and/or Air Operations Manager should focus on weight, putting the most lightweight rescuers and gear onboard first. All helicopters have altitude limitations that are exacerbated on hot and dry days. Flight For Life’s helicopters are less able to fly with more than one rescuer early in the

operation, and especially in summer. This is especially true in the mountain areas near the Flight For Life bases, where the travel times are short, and less fuel is burned off.

Charges for Flight For Life Responses

There is NO cost to the patient or the AHJ for any of the responses mentioned above unless a patient is transported to a hospital. The only time Flight For Life charges for service is when a patient is flown to a hospital. In that case, the patient is billed for the service just as in any medical transport.

PART 2 | LIFT TICKET PROGRAM

Developed by SAR teams, County Sheriffs and Flight For Life, The “Lift Ticket” program is designed to insert rescuers into the field, improving response time and reducing the need for rescuers to hike several miles into the backcountry.

In these SAR missions, the Flight For Life crew can also give care to the patient and quickly transport him or her to an appropriate hospital when the patient’s condition warrants an evacuation by medical helicopter.

In order to participate, each SAR Lift Ticket member must be accredited annually and present his/her accreditation card prior to boarding the aircraft during a SAR mission.



Rescue members train with Flight For Life crewmembers as part of their Lift Ticket accreditation.
Photo courtesy Charley Shimanski

LIFT TICKET TRAINING PROTOCOL

Required Training for the Lift Ticket Program

All SAR members participating in the Lift Ticket program are required to attend an annual Lift Ticket accreditation training with Flight For Life crewmembers.

During the Lift Ticket accreditation training, the Flight For Life crewmembers will cover the following information (further detailed later in this material):

1. Safe landing zones (LZs) and other information pertinent to landing the helicopter
2. How to approach the aircraft
3. Rotor wash, precautions of loose items, and noise/ear protection



After the demonstration of procedures by the flight crewmembers, the SAR members will then be required to individually demonstrate their proficiency.

Photo courtesy Steve Wilson

4. Correct operation of the doors, keeping in mind that SAR members will usually enter and exit through the jump seat side only (left side facing forward)
5. Location of the emergency exit handles, fire extinguisher and survival gear
6. Location of the Emergency Locator Transmitter (ELT) and the ELT switch in the cockpit
7. Emergency shutdown procedures
8. Medical equipment on the helicopter and capabilities of the medical crewmembers
9. How all loading and unloading of Lift Ticket participants will take place on the jump seat/sliding door side of the aircraft (left side facing forward)
10. Proper securing of equipment and backpacks to the stretcher
11. Procedures to put on and secure helmets and seatbelts
12. Onboard communications procedures including use of the helmet microphone and communication switch device (Carter Box) to communicate through the onboard intercom
13. “Hot loads”—the entry to and exit from a helicopter while the rotors are turning

SKILLS DEMONSTRATION

After the discussion of procedures by the flight crewmembers, the SAR members will then be required to individually demonstrate their proficiency at the following:

LOADING

1. Opening the aircraft door from the outside
2. Entering the aircraft
3. Securing the helmet and seatbelt
4. Closing the door
5. Operating the Carter Box for onboard intercom communications
6. Internal emergency shutdown procedures should be demonstrated as well, and rescuers should be familiar with operation of the fuel shutoff, rotor brake, and battery shutoff.



Flight For Life crewmembers will give each rescuer a Lift Ticket Accreditation Card upon completion of their training and skills demonstration.

UNLOADING

1. Opening the aircraft door from the inside
2. Removing and re-securing helmets and seatbelts, including closing and securing the seatbelt
3. Emergency exit location and operation (as a demonstration only, no actual operation of emergency exits)
4. Exiting and closing the aircraft doors

At the end of the skills demonstration, each SAR member will be given a personalized orange Lift Ticket ID card that expires one year from the date issued.

ONCE A SAR MEMBER IS ACCREDITED

Once a SAR member is accredited into the Lift Ticket program, he/she is able to be flown to search and rescue scenes when the Lift Ticket program is underway during a rescue call.

Lift ticket participants MUST have a current Lift Ticket card to board the Flight For Life helicopter. Only those with current cards will be flown. If a SAR team member does not have a card, he/she might go in last after they receive a safety briefing from the crew before loading.

The Lift Ticket program requires one Flight For Life medical crewmember to be on board at all times to serve as a “safety escort” to the rescue member being transported.

An alternative is to have one Flight For Life crewmember at each LZ (Incident Command LZ and Scene LZ) to directly assist the loading and unloading (a so-called “Modified Lift Ticket”). If weight is not an issue, then two SAR members can be flown at once under this Modified Lift Ticket program.

Some SAR members keep current on training for Avalanche Deployment and Lift Ticket. If a rescuer has a current Avalanche Deployment or Rescue Deployment card, he/she may function in a deployment role (meaning they can operate “independently” without crewmember assistance). If the Avalanche Deployment or Rescue Deployment card is greater than 30 days past the last recertification date, it acts as a Lift Ticket card until one calendar year after the last recertification date indicated on the card. If there is any discrepancy Flight For Life crew should contact the AHJ.

ACTIVATION OF THE LIFT TICKET PROGRAM DURING A SAR MISSION

When Flight For Life is requested for a search and rescue mission and use of the Lift Ticket is requested, the helicopter will proceed to the Incident Command LZ to pick up and shuttle in qualified SAR personnel under the Lift Ticket program.

If the scene location is known and will not take the aircraft out of a reasonable distance from the Incident Command staging area, a Scene Recon will be performed prior to responding to the Incident Command staging area. This will give the pilot the ability to assess the scene and perform a power check (particularly important at high altitude scenes and/or during periods of high temperatures, which limits aircraft performance).



The Lift Ticket program requires a medical crewmember to be on board during shuttles.

At any time, the Flight For Life crew reserves the right to abort or change the mission to include: personnel, LZs, and equipment. SAR members may choose not to perform the mission as well. Flight For Life applies a rule called “Three to go, one to say NO”—a safety policy that means that all three persons on board must agree to the mission, and if any one person is uncomfortable or notices something affecting the safety of the crew, that person can abort the flight at any time (including SAR personnel). This is a policy that is paramount to safety and a point that cannot be overstated. Each soul on board must feel absolutely comfortable with speaking up and saying, “NO GO!”

Prior to Boarding the Helicopter

Before the helicopter lands to pick up rescuers, the rescuers must have their Lift Ticket accreditation cards out and visible. This will be the FIRST thing that the Flight For Life medical crewmember will ask for. Rescuers should also not approach the helicopter without the prior authorization of the AHJ and the Incident Commander.



Only rescue personnel that have a current Lift Ticket accreditation card will fly.

Helmets, Hats and Goggles

Once on board the aircraft, rescuers are required to wear one of the Flight For Life helmets, and should therefore be prepared for that. This means removing hats and goggles before boarding the helicopter, and safely storing them for use once the rescuers exit the aircraft.

Personal helmets should be placed *inside* the rescuer’s backpack because the backpacks must be strapped down on the gurney (over the skis in the winter). If the helmet is on the outside, it may interfere with that process, making it more difficult to secure the packs.

Due to the rotor wash, EVERYTHING must be secured properly, including packs, helmets, gear, glasses, goggles, etc. Baseball-styled caps must NEVER be worn around or onboard the aircraft.

Upon Arrival at the Incident Command LZ:

1. The medical crew will exit the aircraft, taking the key trauma kit and other equipment to reduce weight.
2. Both medical crewmembers will approach awaiting rescuers and confirm that their Lift Ticket cards are current. The crew and rescuers will then brief each other on the objectives, mission specifics, safety concerns, and risks associated with the mission.
3. The helicopter will be shut down during this process, unless the pilot requests a hot load.
4. When ready to start moving SAR personnel under the Lift Ticket program, Lift Ticket personnel and medical crew will proceed to aircraft.
5. The medical crew will assist the SAR member in getting into the aircraft, securing belts and their equipment, and helmets, and will shut the doors.
6. During winter, rescuers must strap their skis/snowshoes and poles together tightly before approaching the aircraft. This prevents fumbling around with loose skis and poles and creates a single bundle for loading and unloading.
7. All loading and unloading will take place on the side of the aircraft of the sliding door (left side facing forward, opposite the pilot).
8. SAR members will often ride on the right seat, behind the pilot. The medical crewmember will ride on the jump seat (left side facing forward) so that they can assist with any LZ evaluation.
9. If there is a rescue dog to be shuttled in, the dog should be secured with a leash at all times, including inside the aircraft. (There is an eye bolt with tether for securing the dog inside the aircraft.) The dog should be loaded after the SAR member is secured in his/her seat. The dog should be lifted into the aircraft and handed off to the SAR member.
10. One of the medical crewmembers will usually stay on the aircraft during the shuttles to the scene. The other crewmember will stay behind at the staging area with medical equipment and stow it safely away from the LZ.

11. The medical crewmember on board will assist SAR members in all aircraft operations and oversee all loading, unloading, and functioning within the aircraft.
12. Upon arrival at the rescue scene, the flight crewmember will exit the aircraft first and assist SAR with exiting and gathering of their equipment.



The pilot will make the final decision as to whether a mission can be safely attempted and accomplished.

Photo courtesy Charley Shimanski

13. If altitude, weather or weight are of concern and only one SAR person can be taken by the pilot (with no crewmember on board), one flight crewmember will be positioned at the Incident Command area LZ and one at the Scene to facilitate loading and unloading (the “Modified Lift Ticket”; see below).
14. Once a sufficient number of SAR members are inserted, the Incident Command may ask that the pilot either go to the scene or stage at the previous Incident Command LZ where SAR members were picked up. If the patient condition is critical and SAR requests the flight crew proceed to the scene, then either the Flight For Life nurse or paramedic should go in.
15. If the pilot allows, both the flight medic and flight nurse can be inserted into the scene, with permission of the AHJ. This is the best-case scenario. If only one flight crewmember can go in, the other crewmember will be picked up as soon as the pilot allows.

During any Lift Ticket activation:

1. The pilot will make the final decision as to whether or not a mission can be safely completed.
2. The pilot will “flight follow” with the appropriate communications center directly or with assistance of another communications center during the operation. “Flight following” means that the communications center(s) are able to track the location and status of the aircraft. The pilot will make every effort to update the communications center every 10-15 minutes when flying.
3. The pilot may also assist with communications between the SAR team, scene command and flight crew, as needed.

“MODIFIED” LIFT TICKET

In order to expedite transport of multiple rescuers, a “Modified Lift Ticket” may be initiated. In this case, one flight crewmember would be positioned at the Incident Command LZ and one at the Scene LZ to facilitate loading and unloading of TWO SAR personnel with no crewmember on board.

If weight is a factor due to extremes in temperature (warm air being “thinner” and decreasing aircraft performance) and/or high altitudes, only one SAR member will be taken at a time. As the mission evolves and the helicopter becomes lighter through the consumption of fuel, there will be an increase in aircraft performance and heavier loads will generally be allowed on subsequent shuttles. The B3 burns roughly 40 gallons/hour, at 6.7 lbs./gallon—which equates to losing roughly 4.5 lbs. of weight each minute.

PART 3 | AVALANCHE DEPLOYMENT PROGRAM

This section outlines the rigid training program that has been initiated to properly train teams to safely operate in and around the aircraft. At the same time, all agencies, themselves should maintain an equally rigid training regimen for their rescuers when it comes to search and rescue elements not related to aviation assets.



The Avalanche Deployment Program combines the skill, expertise, and stamina of SAR and Ski Patrol dog teams and the Flight For Life Colorado helicopter and crew.

Photo courtesy Charley Shimanski

Colorado leads the nation in fatalities caused by avalanches. But with the proliferation of cell phones and rapid response by rescuers, avalanche survival is possible.

Surviving an avalanche is a race against time. According to the Colorado Avalanche Information Center, at 15 minutes about nine in 10 people buried in an avalanche can survive, but by 30 minutes, only 50 percent survive (although there have been long burial outliers who have survived in Colorado).

What is the Avalanche Deployment Program?

The Avalanche Deployment Program is a one-of-a-kind program developed by Flight For Life, with the primary mission of rapidly inserting an Avalanche Deployment Team to the scene of an avalanche accident. The Team consists of a Snow Safety Technician (*aka* “Snow Tech”), a dog handler, and an avalanche rescue dog—or in some cases, two Snow Techs with no rescue dog.

A Relationship That Works

The Avalanche Deployment Program combines the skill, expertise and stamina of SAR team members and dog teams with the rapid insertion of a Flight For Life helicopter and crew. These combined teams allow for the rapid location and expedited rescue of an injured or ill party and rapid transport to appropriate medical care.

THE TEAM PLAYERS AND THEIR ROLES IN AVALANCHE DEPLOYMENT

Avalanche Dog Handlers

Dog handlers participating in the Avalanche Deployment Program must be avalanche certified with their particular avalanche dog. Certification is through Search and Rescue Dogs of Colorado (SARDOC), Colorado Rapid Avalanche Deployment (C-RAD), Front Range Rescue Dogs, (FRRD), or a similar testing program approved by the Flight For Life Avalanche Deployment coordinator.

Avalanche dog handlers must also be competent in winter travel and survival. They must complete their helicopter safety training including:

- the annual Avalanche Deployment pre-season training and
- documentation of their monthly training on their Avalanche Deployment card

They must carry and display this card any time they are deployed.

Duties of the dog handler include management and handling of the avalanche dog in-flight and on scene and assistance in all phases of an avalanche search and rescue. Duties also include loading equipment into and out of the aircraft, operating the aircraft doors, entering and exiting the aircraft in accordance with Flight For Life guidelines, and operating the aircraft radios.

Snow Safety Technicians

Snow techs must have at least a Level 2 certificate of completion or comparable experience, and only the most senior and competent individuals in this category should go into the scene on an actual Avalanche Deployment.

Like avalanche dog handlers, Snow Techs must also be competent with snow safety issues and in winter travel/survival. They must complete their helicopter safety training including the annual Avalanche Deployment pre-season training and document their monthly training on their Avalanche Deployment card. They must carry and display this card any time they are deployed.

Snow Techs are responsible for determining snow conditions at the scene, the safety of the scene, conducting avalanche transceiver and RECCO searches, and caring for others on the scene. Their duties also include loading equipment and the rescue dog into/out of the aircraft, entering and exiting the aircraft in accordance with Flight For Life guidelines, and operating the aircraft doors and radios.

Avalanche Rescue Dogs

The avalanche rescue dogs, certified in avalanche recovery, are the heart of the Avalanche Deployment Program. They must be avalanche certified with their particular dog handler, through SARDOC, C-RAD, FRRD or a similar testing program approved by the Flight For Life Avalanche Deployment coordinator.

Each dog must be certified with each particular handler. Many of the ski patrol dogs have multiple handlers, so the dogs must pass the certification tests with each handler in order for that particular team (1 dog + each handler) to certify.

Avalanche dog handlers must bring their dogs to the annual Avalanche Deployment preseason training and attempt to expose and familiarize the dogs to the turning rotors, cold, wind and noise.

Roles, Responsibilities and Expectations

The roles, responsibilities and expectations of an Avalanche Deployment Team—especially the first team in—have evolved in recent years to better match the needs of an expanding avalanche rescue operation. The first Avalanche Deployment Team is literally the eyes and ears of the Incident Commander. The team's initial actions or inactions will set the tone for the operation. How well the team assesses the situation, identifies the problems, formulates a plan and communicates all this back to the command post will have a direct impact on the rest of the response.

In addition to the traditional roles of the dog handler (searcher and hazard evaluator) and Snow Tech (hazard evaluator and searcher), their roles also include site leader, witness interviewer, operation planner, and medical provider. In addition to assessing the hazard and determining go/no-go for the rescue, additional key responsibilities for the first Avalanche Deployment Team include scene size-up, formulating search strategies and tactics, communicating needs and actions, deciding to resuscitate or not resuscitate a victim, and caring for themselves and patients in austere settings.

The expectations are that the most competent rescuers participate in the Avalanche Deployment Program. They include skilled and highly experienced ski patrollers and mountain rescuers who can work in harsh environments, assess dangers, organize and conduct initial rescue efforts, care for patients, extricate themselves from hazardous terrain, and communicate plans and actions well.

AVALANCHE DEPLOYMENT: THREE PHASES

There are three key phases to the deployment aspect of an Avalanche Deployment response: pre-flight, in-flight, and post-flight. In all three phases, it is critical that Avalanche Deployment members maintain situational awareness, knowing what is going on around them at all times throughout the operation.

PHASE 1 | Pre-flight

The pre-flight phase includes a discussion with the Flight For Life medical crewmembers before the first Avalanche Deployment Team loads its gear and closes the helicopter doors. The Avalanche Deployment Team and crewmembers should quickly share information and brief one another about the rescue situation and threats. Identifying threats improves preparedness. Threats are those events and concerns (e.g., weather, darkness, avalanche danger, remoteness, number of victims, uncertainties, etc.) that increase operational complexity requiring additional effort to maintain safety.

PHASE 2 | In-flight

Once the Avalanche Deployment Team has loaded and the doors are closed, the team and pilot work together, share information and brief one another on the situation and threats. While in route, the first Avalanche Deployment Team identifies and assesses an overland route, hazards along the way, and access to and confirmation of the accident site's location.

While there is urgency to getting rescuers on the ground, this urgency must be balanced with the unique intelligence-gathering capabilities of being airborne. The aircraft is a valuable airborne resource to assess immediate hazards, size-up the scene (dimensions of the avalanche, number and size of debris areas, verify tracks in and out, search for obvious clues), formulate an initial search and rescue plan, and communicate this information back to the command post before getting dropped off.

This aerial assessment also gives the pilot time to circle the scene to better identify and familiarize

himself or herself with wind conditions, power level needs, and approaches to the LZ. The team should work with the pilot to select an appropriate LZ and backup LZ, and keep an eye out for ground hazards such as towers, wires, and trees.

The first Avalanche Deployment Team must be careful not to leave the aircraft until they and the pilot know where they are being dropped off, have formulated a plan, and have communicated with the Incident Command leadership.

Subsequent Avalanche Deployment Teams will have a lighter workload compared to the first team. Still, follow-up teams must continue to work with the Flight For Life medical crewmembers and pilot to confirm and verify plans, and continue to be alert to missed or changing conditions. In some situations where the search and rescue problem is simple (such as a small avalanche and good information about the situation), the follow-up teams may fly directly to the Scene LZ. In other situations where the problem is complicated or complex (a large avalanche, multiple debris areas, unsure of location, unknown number of victims, changing light conditions—flat light versus bright sun, etc.), an additional few minutes assessing the scene from the air may provide subsequent teams with information and clues that reduce uncertainties.

PHASE 3 | Post-flight

The post-flight phase starts once the helicopter has dropped off the first Avalanche Deployment Team and flown away. The first team in must attempt to establish communications with the command post before doing anything else. If no direct communication with the command post is possible, the team must communicate this to the pilot, and use the pilot as a relay until a permanent ground-based radio relay can be established. In complex rescues involving multiple patients or a very large search area, Flight For Life may provide a second helicopter dedicated to relaying communication, if needed.

With communications established, the Avalanche Deployment Team is ready to work. Generally, the better the plan from the air, the smoother and easier it will be to implement the plan when on the ground.

Still, rescuers must be ready for a different situation than anticipated, requiring a significant change to the original plan. Examples may include:

- the buried person has been found, resulting in an immediate shift to a medical emergency from a search problem
- changing weather conditions prevent the helicopter from returning
- more dangerous avalanche conditions than anticipated
- rescuers learn more people were buried than expected
- the helicopter leaves to refuel just before rescuers locate the buried person
- rescuers are inadvertently dropped off at the wrong avalanche

Once the avalanche site effort is complete—whether successful or not—rescuers must exit the field. As mentioned earlier, this may or may not include the helicopter, and rescuers must be prepared to either spend a long time at the scene or self-extricate. As such, rescuers must have experience in self-extrication to exit the field safely.

HOW THE AVALANCHE DEPLOYMENT PROGRAM WORKS

Thanks to the proliferation of cell phones, backcountry avalanches are often reported just minutes after they occur. Once an avalanche is reported with a witnessed burial, missing person, or “tracks in and no tracks out,” many things occur that result in an Avalanche Deployment.

Request for Flight For Life Avalanche Deployment Response

Once notification of an avalanche burial is made to law enforcement, the local sheriff’s office requests a search and rescue team response and the Flight For Life Avalanche Deployment Program. (Only an AHJ—usually a sheriff or National Park Service official—can activate the Avalanche Deployment Team.) The AHJ contacts the Flight For Life Communication Center directly to determine Flight For Life availability.

It is important to note that every avalanche deployment will be different, and the sequence of events might change depending on the circumstances. Still, the following will often occur when an Avalanche Deployment is requested:

- The AHJ representative handling the call will convey any pertinent information to assist with the flight to include:
 - position/location of the avalanche (in Degrees – Decimal Minutes if known)
 - ground contact and designated radio frequency at the scene
 - availability of a staging area at the scene for the helicopter and flight crew
- The Flight For Life Communications Center will maintain a daily list of available Avalanche Deployment Teams and will choose the closest or fastest-responding team available at the time of the request. The Flight For Life Communications Center will be responsible for notifying the Avalanche Deployment Team.

Three Landing Zones Utilized During an Avalanche Deployment

There are usually three key Landing Zones that are utilized during an Avalanche Deployment. These are:

1. Ski patrol or rescue team “Rendezvous LZ” – the LZ where Dog Handlers, Dogs, and Snow Techs are picked up by the Flight For Life helicopter to be taken to the scene
2. Scene LZ – the location of the accident, or a safe and suitable landing zone somewhere nearby
3. Incident Command LZ – a landing zone near the rescue Incident Command Post, enabling the Flight For Life helicopter to launch subsequent Lift Ticket shuttles

Occasionally the Rendezvous LZ and Incident Command LZ are the same (e.g. a parking lot at a Ski Area). In the case of any parking lot, officials should cordon off the LZ where there may be a danger of vehicles or individuals entering the LZ, and the Incident Commander should assign an Air Operations Manager and a Parking Tender to help guide the helicopter to a safe landing using radio communications and hand signals.

Launching of the Flight For Life Helicopter

Once an Avalanche Deployment is requested, the closest available Flight For Life helicopter is dispatched to pick up the closest on-call Avalanche Deployment Team at a predetermined Rendezvous LZ designated by the requesting Sheriff or their designee.

Upon arrival at the Rendezvous LZ:

- The medical crew will exit the aircraft, taking their primary trauma kit and any other equipment.
- Both medical crewmembers shall approach the awaiting Avalanche Deployment Team and review their Avalanche Deployment cards, checking for currency while answering any questions.
- The Avalanche Deployment Team will then proceed to the aircraft and load the dog handler and dog. The Snow Tech will secure their equipment and board the aircraft.
- At the same time, one medical crewmember exits the LZ and safely stows the medical gear.
- The other medical crewmember will stand by to see that the Avalanche Deployment Team is loaded correctly and that the doors are closed.
- Once the team is on board, this medical crewmember will give a “thumbs-up” to the pilot and exit the LZ when the team has loaded. (A more detailed loading description follows, under “Sequence for Avalanche Deployment Loading and Unloading a Snow Tech, Dog, and Dog Handler.”)
- The flight crew will await the return of the helicopter to the Rendezvous LZ to be up and relocated either to the Incident Command LZ or to the Scene LZ as determined by the flight crew and Incident Commander.

Procedures Once Airborne

After flying over the avalanche path and confirming whether or not there is a possibility of victims, the Avalanche Deployment Team may request:

- An aerial survey of the scene before landing
- To be dropped off immediately for a search of the area

- To return to the Incident Command Post to update the Incident Commander

If the Snow Tech confirms the scene is safe, the pilot will drop off the Avalanche Deployment Team and return to the Rendezvous LZ where the flight crew is staging, or as directed by Incident Command.

Pilot’s Responsibilities During an Avalanche Deployment

During an Avalanche Deployment, the pilot’s responsibilities include:

- Making a final decision as to whether or not a mission can be safely accomplished. The pilot should comply with all current operating procedures, weather minimums, and other program directives.
- Flight following with Flight For Life Communications Center directly, making every effort to update every 10-15 minutes. The pilot may also assist with communication between the scene, Incident Command, and the flight crew as needed.



The Avalanche Deployment Program requires that rescuers submit to an accreditation every four weeks.

Avalanche Deployment Accreditation

Unlike the annual accreditation of the Lift Ticket program, the Avalanche Deployment Program requires that rescuers submit to an accreditation every four weeks.

The accreditation is the responsibility of the Avalanche Deployment participants, themselves. Each participant is responsible for maintaining a working knowledge of the aircraft by attending briefings with a flight crewmember on the Flight For Life helipad or a prearranged LZ every four weeks. Each member must demonstrate proficiency with operating the aircraft doors, getting safely into the aircraft, buckling of seatbelts, donning the helmet correctly, and demonstrating correct use of the Carter Box. They also bring ski gear and packs, and demonstrate loading and unloading as detailed in the subsequent pages. Snow Techs will often bring along a dog handler and dog to practice together as a team, going through the sequence with gear and the dog.

Communication

On an actual Avalanche Deployment operation, the Flight for Life crew will bring two portable handheld radios; each has key SAR and other radio frequencies. On their monthly check offs, rescuers should familiarize themselves with these radios.

In the event of a real deployment, rescuers must confirm what frequency the deployment is on, as the onboard air-to-ground radio may be their only communication.

Rescuers also should check with the pilot and see if he or she has any other information, such as Incident Command's ("IC") call sign, number of possible victims, the contact names for sheriff's deputies, SAR, etc., or if the IC has not yet been established. It is not possible to over-communicate in these events.

Finally, it cannot be overemphasized how important this first team is to the whole rescue operation. As the first rescuers on scene, the Avalanche Deployment Team has numerous responsibilities that can go beyond just putting the dog in position to search. This can include:

1. Establishing safe LZs and staging areas; and suggesting access routes for ground teams
2. Face-to-face interviews with witnesses
3. Determining a last seen area

4. Searching with transceivers, RECCOs and probes
5. Assessing the magnitude of the slide and number of victims, which may increase the need for additional resources
6. Maintaining appropriate communication with IC and other teams
7. Performing initial medical evaluations

The Snow Tech must recognize the multiple roles and dynamic situation that he or she may face when entering this type of rescue. Most importantly, key information must be relayed to the IC or appropriate contact personnel until the IC has been established.

Rescuer Orientation and Route Planning

Part of the "team" approach for the first Avalanche Deployment Team flying to a rescue scene includes working with and talking with the pilot to identify flight hazards (wires, towers, trees, etc.) and discussing flight route/location. This allows Avalanche Deployment rescuers to adequately assess hazards, site ingress and egress; to size up the scene; and to confirm communications and the initial plan with the Incident Commander.

As mentioned earlier, the first Avalanche Deployment Team should use the aircraft as a platform to adequately develop situational awareness, formulate a plan and communicate back to the Incident Commander before being dropped off.

OTHER RESCUE EQUIPMENT

RECCO

LG2 in Frisco and LG5 in Durango are equipped with a handheld RECCO detector that can be used by deployment teams to ground-search the avalanche.

The Flight For Life medical crew should load the RECCO unit on board the aircraft before departing from their Frisco or Durango helipad. Rescuers should make certain a RECCO is included in their gear prior to loading. Every rescuer should be proficient with the use of a RECCO. The detector should be used anytime a buried person is suspected or known.

Long-Range Avalanche Receiver

LG2 and LG5 are also equipped with the Barryvox helicopter antenna system (*aka* HAS457). The omnidirectional 457 kHz antenna hangs a few meters below the helicopter skids and enables aerial searching for a receiver signal.

The external antenna is designed to be used early in an avalanche response when there is a very large avalanche to be searched or when there is significant



The omnidirectional 457 kHz antenna hangs a few meters below the helicopter skids and enables aerial searching for a transceiver signal

additional avalanche danger above the debris field to be searched, which would increase risk to ground teams. The antenna is not meant to replace any component of the SAR or Ski Patrol resources; rather, it is another tool to be used when appropriate.

The external antenna is only used when requested specifically by the Incident Commander or their designee. There is no current algorithm that says when it will or will not be deployed—it is entirely up to the IC and the discretion of the flight crew.

The range is approximately 100 meters in diameter from the antenna under ideal search conditions, and multiple burials can be managed. Nearly perfect flying conditions are required for the long-range antenna to be used.

Because of Flight For Life's closed-door policy, the crew will often deploy the antenna at the staging

area. The antenna is normally stored in an external compartment of the helicopter, so the helicopter must land to retrieve it from that location and move it into the crew compartment from where it is deployed. It can be deployed in flight however, so if it is known that an external transceiver search will be requested, the antenna can be set up by the crew on the way to the scene, eliminating the need to land and get the antenna out of the rear compartment.

The receiver is wired into the intercom system, so the pilot and crew can hear a signal, zero in on it, and then drop a marker onto the debris. Ground-rescuers then pinpoint the exact location.

Only Flight For Life crew may be on board during an avalanche transceiver search. The antenna is flown 10-20 feet above the slide debris, so the mission is performed almost entirely in Out of Ground Effect (OGE) hover conditions, at less than 10 knots of airspeed. These conditions require maximum performance of the aircraft, so weather conditions are a limiting factor. Moderate winds with strong gusts, or higher temperatures may make aerial transceiver searches impossible.

Studies performed in Austria and Switzerland have demonstrated no adverse effect to dog searches performed after the helicopter search. The rotor wash and jet fuel exhaust has no demonstrable effect on the scent on the snow surface. The only limitation with canine operations is that the dog team and helicopter cannot be operating at the same time.

Sked Stretcher

A valuable piece of equipment aboard Flight For Life helicopters is a Sked rescue stretcher. It not only transports patients over snow, but is also used for horizontal hoisting by helicopter or vertical hoisting in caves or industrial confined spaces. While very portable, the Sked stretcher becomes rigid when a patient is packaged inside it. The stretcher is rolled for storage, and located in the external storage compartment on the back left of the fuselage when facing forward.

SEQUENCE FOR AVALANCHE DEPLOYMENT LOADING AND UNLOADING

The sequence for loading and unloading is the key to a successful Avalanche Deployment operation.

Key Goals of Loading Procedures

The goals of loading procedures are as follows:

- To optimize safety through a well-defined and disciplined loading protocol that should be well-known to all accredited rescuers
- To manage the loading operation quickly—an important goal, given the high-risk of an activity that occurs while rotors are turning
- To manage the loading of what could become an unpredictable resource—an avalanche rescue dog
- To manage this loading efficiently and effectively in an orchestrated manner that is well understood by the pilot

Listed on the following pages are very detailed loading and unloading procedures for the Avalanche Deployment program. It is important to note that these procedures represent a suggested sequence. The uniqueness of each operation makes flexibility important, and the loading and unloading sequence might vary from those detailed here.



The Flight For Life medical crew will confirm that the rescuers have valid Avalanche Deployment cards and dog-handler cards. *Photo courtesy Charley Shimanski*

Avalanche Deployments with a Snow Tech, Dog and Dog Handler

The following loading procedures are recommended for Avalanche Deployment operations with a Snow Tech, rescue dog and Dog Handler:



The Dog Handler prepares to drag the skis to the helicopter after it lands, while the Snow Tech secures the dog. *Photo courtesy Charley Shimanski*

LOADING

1. The Flight For Life medical crew will meet the Avalanche Deployment Team members away from the helicopter and confirm that the rescuers have valid Avalanche Deployment cards.
2. The Snow Tech must have control of the dog and remain safely away from the helicopter.
3. At the same time, the Dog Handler, wearing his/her backpack, picks up one end of the two tightly bound ski-gear packages and drags them to the helicopter placing them directly next to the helicopter's skid.
4. Leaving the skis flat on the ground, the Dog Handler then takes off his/her backpack and places it next to the skis.
5. The Dog Handler boards the helicopter and puts on his/her seatbelt and helmet.
6. Next, the Dog Handler signals to the Snow Tech to bring the dog to the helicopter.

7. The Snow Tech, wearing his/her backpack, brings the rescue dog to the aircraft by one of two methods:
 - a. Holding TWO points of contact—the dog’s collar and vest.
 - b. Having a leash that connects to two points on the dog. This is an alternative to putting two hands on the dog, since the tech is less likely to stumble and fall trying to walk with two hands on a dog while wearing ski boots. This is easily accomplished by girth-hitching the leash to one and clipping it to the other.
8. The Snow Tech then helps to load the dog by lifting the animal into the aircraft. (Even if the dog can load the helicopter by jumping in, the tech should always assist the dog so that there is little to no chance the dog may slip or fall and be injured.) The dog should be secured with a leash at all times, including inside the aircraft, as well. (There is an eye bolt with tether for securing the dog inside the aircraft.)



With one hand securely holding the dog’s harness, the Snow Tech lifts the dog onboard and guides the dog to the Dog Handler.

Photo courtesy Charley Shimanski

9. The Snow Tech then checks that the gurney belts are open and loads the skis on to the gurney. He/she must never raise the skis or backpacks above the waist. **IMPORTANT:** the Snow Tech must make certain the seatbelts on the gurney are open before placing the skis in—this will also make it easier when loading the backpacks.

10. The Snow Tech places one pack on the leg belt and secures it. The Snow Tech then places the second pack on the chest belt and secures it. This allows the packs to go on top of the skis and makes the whole process easier.
11. The Snow Tech then closes the forward door, boards the helicopter and puts his/her seatbelt and helmet on.
12. Finally, the Snow Tech closes the rear door.
13. Using the Carter Box, the Snow Tech informs the pilot that the doors are closed and secure, and that the rescuers are ready to go.
14. The pilot will then perform the “Heads Up Check” and will take off for the scene.

Key Goals of Unloading Procedures

Like loading, the goals of the unloading procedures are as follows:

- To optimize safety through a well-defined and disciplined unloading protocol that should be well known to all accredited rescuers
- To manage the unloading operation quickly—an important goal, given the high-risk of an activity that occurs while rotors are turning
- To manage the unloading of what could become an unpredictable resource—an avalanche rescue dog
- To manage this unloading efficiently and effectively in an orchestrated manner that is well understood by the pilot

It is important to reiterate that these procedures are guidelines, and the uniqueness of each operation means that unloading procedures might vary from those detailed here.

UNLOADING

The following unloading protocol is recommended in the Avalanche Deployment Program:

1. First, the pilot confirms to the team that it is safe to unload.
2. The Snow Tech takes his/her helmet off and places it on the hook overhead so that it is out of the way of the dog and handler unloading.

3. The Snow Tech unfastens his/her seatbelt, reaches behind him/herself and re-clips the seatbelt together so that the next crew or team can easily find it.
4. The Snow Tech opens the door and exits the aircraft. Once on the ground, the Snow Tech unclips the leg and chest belts and unloads the packs, placing the gear on the ground just forward of the skid.
5. The Snow Tech unloads the skis/poles and places them flat on the ground next to the packs, being careful to never raise the skis above his/her waist.
6. The Snow Tech refastens the gurney seat belts so they do not fall in the door jams or outside.
7. The Snow Tech takes control of the dog, unloads the dog and goes directly to the skis and packs under the rotor disk (unless instructed otherwise by the pilot). The Snow Tech and dog should remain low on the ground at about the 10 o'clock position (just ahead of the nose of the aircraft on the port side) where the Snow Tech has eye contact with the pilot.



Rescuers at the 10 o'clock position outside the aircraft after off-loading *Photo courtesy Dale Atkins*

8. The Snow Tech remains in place at this position in order to maintain eye contact with the pilot.
9. By this time, the Dog Handler should have already taken off his/her seatbelt and helmet and placed them in appropriate positions. NOTE: If the dog needs to be controlled, then the Snow Tech should perform this step and take control of the animal. The Snow Tech must maintain control of the dog at all times, until the handler leaves the aircraft.

10. The Dog Handler should make certain that no belts are hanging outside the doors, and then exit the aircraft, closing and securing the doors. The Dog Handler should then move into position on the ground next to the Snow Tech and stay there until the helicopter has safely exited away from the landing zone. After closing the doors, the Dog Handler should check that no belts are hanging outside the doors.
11. At this point, the pilot will take off and exit the scene and perform a radio check with the ground team once airborne.

Loading and Unloading with Two Snow Techs and NO Dog/Handler

Some SAR situations may involve flying two Snow Techs with no rescue dog to a scene. This may occur with Snow Techs from SAR teams that have no rescue dogs. In this case, there might not be a predefined rendezvous LZ, and the Incident Command will determine an appropriate LZ for the loading.

LOADING

The sequence for loading two Snow Techs is different from that when a Dog Handler and dog are present:

1. The Flight For Life medical crew will meet the Avalanche Deployment Team members away from the helicopter and confirm that the rescuers have valid Avalanche Deployment cards.
2. The first Snow Tech, **without** his/her backpack, picks up the two tightly bound ski-gear packages and drags the ski gear on the snow to the helicopter, placing them directly next to the helicopter's skid.
3. The first Snow Tech makes sure the gurney belts are open and loads the ski gear on the gurney. He/she never raises skis above his/her waist.
4. The first Snow Tech then boards the helicopter and puts his/her seatbelt and helmet on.
5. Next, the first Snow Tech signals to the second Snow Tech to approach the helicopter.

6. The second Snow Tech brings the packs out. He/she checks that the gurney belts are open and places one pack on the leg belt and secures the belt, then places the second pack on the chest belt and secures the belt.
7. The second Snow Tech then closes the forward door, boards the helicopter, and puts his/her seatbelt and helmet on.
8. Finally, the second Snow Tech closes and secures the sliding door.
9. Using the Carter Box, the second Snow Tech informs the pilot that the doors are closed and secure and that the rescuers are ready to go.
10. The pilot will then perform the “Heads Up Check” and will take off for the scene.

UNLOADING

The sequence for unloading two Snow Techs is different from that when a Dog Handler and dog are present:

1. First, the pilot confirms to the team that it is safe to unload.
2. The first Snow Tech takes his/her helmet off and places it up on the hook overhead.
3. The first Snow Tech then unfastens his/her seatbelt, reaches behind him/herself and re-clips the seatbelt together so that the next crew or team can easily find it.
4. The first Snow Tech then opens the sliding door and exits the aircraft.
5. Once on the ground, the first Snow Tech unclips the leg and chest belts and unloads the packs. He/she places the gear on the ground at the 10-o’clock position, just forward of the skid.
6. The first Snow Tech goes directly to the packs under the rotor disk UNLESS OTHERWISE INSTRUCTED BY THE PILOT. The tech should remain low on the ground, just ahead of the nose of the aircraft, where he/she has eye contact with the pilot.
7. While the first Snow Tech is performing his/her functions, the second Snow Tech takes his/her helmet off and places it up on the hook overhead.

8. The second Snow Tech then unfastens his/her seatbelt, reaches behind him/herself and re-clips the seatbelt together so that the next crew or team can easily find it.
9. The second Snow Tech exits the aircraft and unloads the skis/poles and places them flat on the ground next to the packs (being careful to never raise the skis or backpacks above his/her waist).
10. The second Snow Tech refastens the gurney seat belts on to the gurney so that they do not fall in to the door jambs or outside the door.
11. The second Snow Tech closes the doors and checks that no belts are hanging outside the doors. He/she then moves directly to the skis and packs under the rotor disk and remains there.
12. Both Snow Techs should be certain that all loose equipment is secure, and then remain in place in order to maintain eye contact on the pilot.
13. At this point, the pilot will take off, exit the scene and perform a radio check with the ground personnel.

OTHER KEY POINTS ABOUT AVALANCHE DEPLOYMENT

There is an important point to remember for Incident Commanders in an Avalanche Deployment. In most cases, one or two initial Avalanche Deployment Teams will be shuttled in and then, if needed, the mission will transition to a Lift Ticket response. In this Lift Ticket response, one medical crewmember will be picked up and remain on board for shuttles of the SAR team members. Therefore, the pilot is going to have to return to the initial Rendezvous LZ, retrieve the flight crew and reposition them at the designated staging area.

Lastly, if the rescue is successful in recovering a viable patient, the flight crew and helicopter will transport the survivor to an appropriate medical facility. As such, all Avalanche Deployment members must have the stamina, skill and gear necessary to extricate themselves out of the field via ground transport, hiking or skiing.

PART 4 | RESCUE DEPLOYMENT PROGRAM

The newest of Flight For Life’s Mountain Rescue Programs is the Rescue Deployment Program. This program was established to assist mountain rescue teams by quickly deploying highly experienced and competent rescue mountaineers to a complex rescue scene.

What is the Rescue Deployment Program?

The Rescue Deployment Program is another one-of-a-kind program developed by Flight For Life. It rapidly deploys a technical rescue-qualified rescuer to the site of a rescue where technical rescue is likely and/or a subject is badly injured.



The Rescue Deployment Program enables rescue teams to quickly deploy highly experienced and competent rescue mountaineers to a complex rescue scene.

Photo courtesy Charley Shimanski

Like the Avalanche Deployment Program, this material outlines the rigid Rescue Deployment training program that has been initiated to properly train teams to operate safely in and around the aircraft. At the same time, the agencies themselves should maintain an equally rigid training regimen for their rescuers when it comes to search and rescue elements not related to aviation assets.

The primary mission of the Rescue Deployment Program is to rapidly deploy rescuers to the scene of a mountain rescue. The Rescue Deployment Team consists of one or more mountain rescue technicians (hereafter called “Rescue Tech”).

Note that the Rescue Deployment Program may be used during winter rescue operations, but it is NOT designed for deployment during avalanche rescues and does NOT include flying Avalanche Techs, Dog Handlers or dogs.

THE TEAM PLAYERS AND THEIR ROLES IN RESCUE DEPLOYMENT

Rescue Techs

Rescue Techs must be competent in backcountry travel and survival. They must complete their helicopter safety training and document their monthly training on their Rescue Deployment card. They must carry and display this card any time they are deployed.

Duties of the Rescue Tech include:

- loading equipment into and out of the aircraft
- operating of the aircraft doors
- entering and exiting the aircraft in accordance with Flight For Life guidelines
- operating the aircraft radios

Once dropped off at the scene, Rescue Techs are responsible for determining the safety of the scene and caring for others at the scene. Their duties include a rapid assessment of the subject’s injuries and an assessment of the safest and most rapid extrication.

Roles, Responsibilities and Expectations

The roles, responsibilities and expectations of a Rescue Deployment Team—especially the first team in—are similar to the evolving Avalanche Deployment Team. The first Rescue Deployment Team is literally the eyes and ears of the Incident Commander, often before the Incident Command has been established. How well the first Rescue Deployment Team assesses the situation, identifies the problems, formulates a plan and communicates all this back to the AHJ and Incident Commander will have a direct impact on the rest of the rescue operation.

The Rescue Tech's role includes site leader, witness interviewer, operation planner, and medical provider. In addition to assessing the hazard and determining go/no-go for the rescue, additional key responsibilities for the first Rescue Deployment Team include scene size-up, formulating rescue operation strategies and tactics, communicating needs and actions, and caring for themselves and patients in austere settings.

The expectations are that the most competent rescuers participate in the Rescue Deployment Program. These individuals must be skilled and highly experienced rescue mountaineers who can work in harsh environments, assess dangers, organize and conduct initial rescue efforts, care for patients, extricate themselves from hazardous terrain, and communicate plans and actions well.

RESCUE DEPLOYMENT: THREE PHASES

Much like the Avalanche Deployment Program, there are three key phases to the Rescue Deployment response: pre-flight, in-flight and post-flight. In all three phases, it is critical that Rescue Deployment members maintain situational awareness, knowing what is going on around them at all times throughout the operation.

PHASE 1 | Pre-flight

The pre-flight phase includes a discussion with the Flight For Life medical crewmembers before the first Rescue Deployment Team loads its gear and closes the doors. The Rescue Deployment Team and crewmembers should quickly exchange information and brief one another about the rescue situation and threats. Identifying threats improves preparedness. Threats are those events and concerns (e.g., weather, darkness, avalanche danger, remoteness, number of victims, uncertainties, etc.) that increase operational complexity requiring additional effort to maintain safety.

PHASE 2 | In-flight

Once the Rescue Deployment Team has loaded and the doors are closed, the team and pilot work together and share information, briefing one another on the situation and threats. While in route, the first Rescue Deployment Team identifies and assesses an overland route, hazards along the way, and access to and confirmation of the accident site's location.

While there is urgency to getting rescuers on the ground, this urgency must be balanced with the unique intelligence-gathering capabilities of being airborne. The aircraft is a valuable airborne resource to assess immediate hazards, size-up the scene, formulate an initial rescue plan, and communicate this information back to the command post before getting dropped off.

This aerial assessment also gives the pilot time to circle the scene to better identify and familiarize himself or herself with wind conditions, power level needs, and approaches to the LZ. The team should work with the pilot to select an appropriate LZ and backup LZ, and keep an eye out for ground hazards, such as towers, wires, and trees.

The first Rescue Deployment Team must be careful not to leave the aircraft until they and the pilot know where they are being dropped off, have formulated a plan, and have communicated with the Incident Command leadership.

Subsequent Rescue Deployment Teams that follow the first team in will have a lighter workload compared to the first team. Still, follow-up teams must continue to work with the Flight For Life medical crewmembers and pilot to confirm and verify plans. Subsequent teams must also continue to be alert to changing conditions.

PHASE 3 | Post-flight

The post-flight phase starts once the helicopter has dropped off the first Rescue Deployment Team and flown away. The first team in must attempt to establish communications with the command post before doing anything else. If no direct communications are possible, the team must

communicate this to the pilot, and use the pilot as a relay until a permanent ground-based radio relay can be established. In complex rescues involving multiple patients or a very large search area, Flight For Life may provide a second helicopter dedicated to relaying communication, if needed.

With communications established, the Rescue Deployment Team is ready to work. Generally, the better the plan from the air, the smoother and easier it will be to implement the plan when on the ground. Still, rescuers must be ready for a different situation than anticipated, requiring a significant change to the original plan. Examples may include:

- Communication with individuals at the scene indicates that the injured party does not require immediate medical attention
- The injured party has been moved to a suitable landing zone, resulting in an immediate shift to a medical emergency from a rescue problem
- Changing weather conditions preventing the helicopter from returning

Once the ground rescue effort is complete, rescuers must exit the field. As mentioned earlier, this may or may not include the helicopter, and rescuers must be prepared to self-extricate.

HOW THE RESCUE DEPLOYMENT PROGRAM WORKS

Thanks to the proliferation of cell phones, backcountry accidents are often reported just minutes after they happen. Once an accident is reported, many things occur that result in a Rescue Deployment.

Request for Flight For Life Rescue Deployment Response

Once notification of a backcountry accident is made to law enforcement, the local sheriff's office may request a search and rescue team response and the Flight For Life Rescue Deployment Program. Only an AHJ—usually a sheriff or National Park Service official—can activate the Rescue Deployment Team. The AHJ contacts the Flight For Life Communication Center directly to determine Flight For Life availability.

It is important to note that every Rescue Deployment will be different, and the sequence of events might change depending on the circumstances. Still, the following will often occur when a Rescue Deployment is requested:

- The AHJ representative handling the call will convey any pertinent information to assist with the flight to include:
 - position/location of the accident (in Degrees – Decimal Minutes if known)
 - ground contact and designated radio frequency at the scene; and,
 - availability of a staging area at the scene for the helicopter and flight crew.

Three Landing Zones Utilized During a Rescue Deployment

There are usually three key Landing Zones that are utilized during a Rescue Deployment. These are:

1. The “Rendezvous LZ” – the LZ where Rescue Techs are picked up by the Flight For Life helicopter to be taken to the scene (In the areas where SAR teams regularly operate the Rescue Deployment Program, there will be a few pre-determined rendezvous LZs.)
2. The “Incident Command LZ” – a landing zone near the rescue Incident Command Post, enabling the Flight For Life helicopter to launch subsequent shuttles under the Rescue Deployment of Lift Ticket programs
3. The “Scene LZ” – the location of the accident, or a safe and suitable landing zone somewhere nearby

Occasionally the Rendezvous LZ and Incident Command LZ are the same, and may be close to a road or parking lot. In these cases, officials must secure the LZ where there may be a danger of vehicles or individuals entering the LZ, and Incident Command should assign an Air Operations Manager and/or Parking Tender to help guide the helicopter to a safe landing using radio communications and hand signals.

Launching of the Flight For Life Helicopter

Once a Rescue Deployment is requested, the closest available Flight For Life helicopter is dispatched to pick up a Rescue Deployment Team at a Rendezvous LZ. The helicopter proceeds to the Rendezvous LZ to pick up the Rescue Deployment Team designated by the requesting Sheriff or their designee. Unlike Avalanche Deployment, however, the determination of the Rescue Deployment Team and location of the Rendezvous LZ will usually be made real-time, in a matter of minutes, and based on Rescue Deployment member availability at the time of the call-out. In fact, this determination might be made once the helicopter is airborne and in route to the incident.

Upon arrival at the Rendezvous LZ:

- The medical crew will exit the aircraft, taking their primary trauma kit and any other equipment desired.
- Both medical crewmembers shall approach the awaiting Rescue Deployment Team and quickly review their Rescue Deployment cards, checking for currency while answering any questions.
- The Rescue Deployment Team will then proceed to the aircraft and load, securing their equipment.
- At the same time, one medical crewmember will exit the LZ to stow the trauma kit and any other gear safely away from the LZ.
- The other medical crewmember will stand by to see that the Rescue Deployment Team is loaded correctly and that the doors are closed.
- Once the team is on board, this medical crewmember will give a “thumbs-up” to the pilot and exit the LZ when the team has loaded.
- The flight crew will await the return of the helicopter to the Rendezvous LZ to be picked up and relocated either to the Incident Command LZ or to the Scene LZ, as determined by the flight crew and Incident Commander.

Procedures Once Airborne

After flying over the accident site, the Rescue Deployment Team may request:

- An aerial survey of the scene before landing
- To be dropped off immediately to initiate a rescue
- To return to the Incident Command Post to update the Incident Commander

If the Rescue Tech confirms that the scene is safe, the pilot will drop off the Rescue Deployment Team at the scene and return to the Rendezvous LZ where the flight crew is staging or as directed by incident command.

If appropriate, the aircraft and entire flight crew can relocate either to the Incident Command LZ or back to their base of operations.

Pilot’s Responsibilities during a Rescue Deployment

During a Rescue Deployment, the pilot’s responsibilities include:

- Making a final decision as to whether or not a mission can be safely accomplished. The pilot should comply with all current operating procedures, weather minimums, and other program directives.
- Flight following with the Flight For Life Communications Center directly or with assistance of another communication center during the operation, making every effort to update every 10-15 minutes

Rescue Deployment Accreditation

Like the Avalanche Deployment Program, the Rescue Deployment program requires that rescuers submit to an accreditation every four weeks.

The accreditation is the responsibility of the Rescue Deployment participants themselves. Each participant is responsible for maintaining a working knowledge of the aircraft by attending briefings with a flight crewmember on the Flight For Life helipad or a prearranged LZ every four weeks. Each member must demonstrate proficiency with operating the aircraft doors, getting safely into the aircraft,

buckling of seatbelts, donning the helmet correctly, and demonstrating correct use of the Carter Box. They also bring packs and demonstrate loading and unloading similar to that in the Avalanche Deployment section.

KEY ELEMENTS OF RESCUE DEPLOYMENT

It cannot be overemphasized how important the first Rescue Deployment Team is to the whole rescue operation. Being the first rescuers on scene, this team has numerous responsibilities, including:

1. Establishing safe LZs and staging areas, and suggesting access routes for subsequent ground teams
2. Face-to-face interviews with witnesses
3. Assessing the rescue scenario and the needs for subsequent rescuers and equipment
4. Maintaining appropriate communication with IC and other teams
5. Performing initial medical evaluations

The Rescue Tech must recognize the multiple roles and dynamic situation that he or she may face when entering this type of rescue. Most importantly, key information must be relayed to the IC or appropriate contact personnel until IC has been established.

Rescuer Orientation and Route Planning

Flying to a rescue scene includes working with and talking with the pilot to identify flight hazards (wires, towers, trees, etc.). The flight route/location must be discussed so that the first Rescue Deployment rescuers can adequately assess hazards, site ingress and egress, scene size-up, select LZ(s), confirm communications and discuss the initial plan with Incident Commander.

As mentioned earlier, the first Rescue Deployment Team should use the aircraft as a platform to adequately develop situational awareness, formulate a plan and communicate back to the Incident Commander before being dropped off.

SEQUENCE FOR RESCUE DEPLOYMENT LOADING AND UNLOADING

The sequence for Rescue Deployment loading and unloading is the same as that for Avalanche Deployment with the notable exception that dogs and skis are generally not part of the operation. See the “Sequence for Avalanche Deployment Loading and Unloading” section called “Loading and Unloading with Two Snow Techs and NO Dog/Handler” for a detailed explanation.

A FOOTNOTE ABOUT THE RESCUE DEPLOYMENT PROGRAM

Rescue leaders and AHJs must remember that the Flight For Life helicopter will originally fly with highly trained Flight Nurses and Flight Paramedics. One thing to remember is that Flight For Life may be able to insert one of its medical crewmembers at the scene and deliver expert critical care soon after the callout. In these cases, it may be more prudent to drop medical crewmembers at the scene, if the AHJ and/or IC authorize doing so.

PART 5 | PROTOCOL FOR LOADING WHILE THE ROTORS ARE TURNING

In many cases, it might be necessary to load a patient while the rotors are turning and the pilot maintains power to the main and tail rotors. This is called a “Hot Load.” A hot load may need to be performed due to weather conditions, terrain, altitude and pilot preference. On these types of missions, only one Flight For Life crewmember may be in the field to evacuate the patient. When this occurs, the following hot load protocol will be followed:

1. Upon arrival at the designated landing zone, a Flight For Life crewmember will exit the aircraft and go outside the rotor disk to the scene personnel while the pilot maintains power to the rotors. At this point, the crewmember will instruct four people (the fewest number possible to carry the patient) on the hot loading of the aircraft. A plan will be shared on how they will approach and depart the running aircraft. The crewmember will also check everyone for any loose items.
2. In hot load situations, the Flight For Life crewmember will designate someone who can speak with the pilot via the radio to be responsible to guard the tail of the aircraft. This person will stand outside the rotor disk and in the pilot’s field of vision, preferably off to the right of the nose of the aircraft. This will allow for a full view of the tail rotor so that this person can control any traffic that may try to approach the aircraft. In areas where there is minimal or no traffic, or there are not enough people on scene to guard the tail, the Flight For Life crewmember will be responsible for clearing the tail area.
3. Anytime someone is going to walk under the rotor disk, that person must make eye contact with the pilot and receive affirmation from the pilot or a crewmember to go forward.
4. All participants in the loading of the patient will be under the direct supervision of the Flight For Life crewmember. No one should approach or depart the aircraft without support from the flight crew.
5. If the patient is not already secured in a vacuum splint or rescue litter, the Flight For Life crewmember will choose one other person to walk with them to the helicopter and remove the stretcher from the aircraft.
6. The assessment of the patient and securing of the patient to the stretcher will be done outside of the rotor disk. Time under the rotor disk should be for the actual load of the patient only.
7. Loading a patient using the aircraft’s stretcher:
 - a. Using the appropriate number of people on scene, rescuers should be at each corner of the stretcher. The Flight For Life crewmember should not help carry the stretcher unless necessary so that he/she can direct and supervise the loading.
 - b. The Flight For Life crewmember will help to make sure the stretcher wheel goes into the track and that the stretcher is level upon being put into the aircraft. He/she will oversee the feet of the patient so that they clear the inside nose portion of the aircraft and that the stretcher is locked into place.
8. Loading a patient packaged in a vacuum splint.
 - a. A preferable method of loading a patient occurs when the patient is already packaged in a vacuum splint by rescuers in the field prior to the arrival of the aircraft. The Flight For Life crewmember pivots the stretcher out from the aircraft while NOT removing the stretcher. The patient can then be loaded on top of the stretcher.
 - b. The Flight For Life crewmember will help to make sure the stretcher is level as it is slid back into the aircraft. He/she will oversee the feet of the patient so that they clear the inside nose portion of the aircraft and that the stretcher is locked into place.

9. Once the patient is secured into the aircraft, the Flight For Life crewmember will escort or direct the group away from the aircraft. Once everyone is safely outside of the rotor disk, the crewmember will clear the tail, close the doors, and prepare to exit the scene.
10. As rescuers exit the helicopter, they must remember to keep their heads low while attempting to maintain eye contact with the pilot.

Go Slow to Go Fast.

A key to loading while the rotor disks are turning is to move S-L-O-W-L-Y. Just because the loading operation is taking place “hot” does not mean rescuers should feel pressured to move quickly. In fact, rescuers must move slowly and take the time to do it right.

PART 6 | INTERFACE WITH COLORADO ARMY NATIONAL GUARD

Flight For Life works closely with the Colorado Army National Guard (COARNG), which can provide helicopter support for SAR operations with UH72 Lakota, UH60 Blackhawk, and CH47 Chinook aircraft from two facilities:

- High Altitude Army Aviation Training Site (HAATS), Gypsum, Colorado
- Army Aviation Support Facility (AASF) Buckley Air Force Base, Aurora, Colorado



Flight For Life Colorado works closely with the Colorado Army National Guard. *Photo courtesy Charley Shimanski*

CAPABILITIES

COARNG can support many types of rescue activities, including rescue operations and search operations, and it is important that SAR personnel refer to other sources for details regarding working with COARNG.

Rescue Operations

Support provided by COARNG during rescue operations includes:

- Rescuer insertion to a field landing zone
- Subject evacuation from a field LZ
- Rescuer deployment to a subject via hoist
- Rescuer evacuation via hoist
- Subject evacuation via hoist packaged in a litter or via jungle penetrator

Search Operations

Support provided by COARNG during search operations includes:

- Aerial observation
- Remote team insertions to LZs in or near search assignments

FLIGHT FOR LIFE AND COARNG OPERATIONS

Whenever an injured subject is evacuated by hoist, COARNG will often transfer that patient to a Flight For Life aircraft via a ground transfer. This is necessary since the hoist-capable COARNG Blackhawks generally do not have a medical crew on board.

Ideally, the patient transfer will not occur “hot” and both helicopters will power down so the transfer can occur with no rotors turning, giving time for the COARNG to suitably transfer the patient with minimal risk.



When an injured subject is evacuated by hoist, COARNG will often transfer that patient to a Flight For Life aircraft via a ground transfer. *Photo courtesy Charley Shimanski*

It is important for SAR command to alert each aircraft that the other is airborne, as well. Flight For Life and COARNG will communicate air-to-air on VHF frequency 123.025 to deconflict operations between aircraft, although they must know that the other is in the area in the first place. Clear communication with each aircraft will let the pilots know that the other helicopter is responding. The air-to-air coordination by the pilots will help the SAR Manager focus on ground operations.

PART 7 | WINTER HELICOPTER OPERATIONS

Winter helicopter operations are very hazardous and should be treated with great caution. There are many disadvantages of helicopter operations in winter mountain rescue operations. Procedures normally used during summer operations must be modified in winter.

First, the one advantage of helicopters in winter is the fact that helicopters require less power at altitude in cold weather due to lower density altitude. A lower-density altitude reduces the power requirement for the aircraft.

LANDING ZONES IN WINTER

Snowfields make very difficult landing zones for two important reasons. First, the white of the snow tends to reduce the pilot's vertical reference, making it difficult to maintain a proper "depth of field." Second, snow can settle under the helicopter's weight.

When a snowfield is used as a helispot, rescuers should not have a Ground Tender. Landing Zone "markers" such as backpacks should be placed near the helispot to provide the pilot with a visual reference that will not be lost in the blowing snow when landing. These markers must be tied down so they do not move during landing.

Landings on snow can also be dangerous if the snowpack is soft. On soft snow, rescuers can stomp out a landing pad using snowshoes, if necessary.

Using Rescuers as Markers

If possible, no rescuers should be in the landing zone at any time during landings on snow as the rotor wash will often cause any loose surface snow to fly around, reducing visibility to zero. There is also a chance that the helicopter's weight will cause it to settle in the snow, which could be dangerous for any rescuer in the area.

Still, there are occasions when a pilot may prefer to use a rescuer as a visual reference in snow landings. In this case, the pilot will request that a single rescuer hunker down directly in the LZ. The pilot will land with the rescuer adjacent to the pilot's door. In this situation, it is important that the rescuer stay low, secure all gear, and use eye protection for operating in the blowing snow of landing. The rescuer should not move until the helicopter is fully on the ground.

Ideal Winter Landing Zones

Although Flight For Life normally seeks the largest open fields available for landing zones, the center of a large open field of snow is a less-than-ideal LZ. Instead, rescuers should try to locate the LZ in the UPWIND end of that large field, within 50-75 feet of a large pine tree. There are two reasons for this:

1. The tree tends to dissipate the snow cloud (billowing of the snow on the ground from the rotor wash)
2. The tree also provides a good point of vertical reference as the pilot tries to put the helicopter on the ground.

As you'll see from the section below, the pilot will often perform a maximum performance landing and takeoff in winter, which further reduces the need for a large LZ.



A Ski Patroller positioned as a point of reference for the pilot to land directly in front of during a snow landing. Photo courtesy Ryan Schumacher

Also, if there is any slope (8-10 degree max), pilots prefer to land across the slope, so the aircraft does not slide backwards.

Marking Landing Zones with Skis

As an alternative to a Ground Tender providing hand signals to the pilot, rescuers can put skis on the snow at the location where a Ground Tender would normally stand. The skis should be laid flat down, bindings down—and rescuers can stomp on them to get them in place. The skis should be placed in a V pointing in direction the wind is coming from—with the open portion in the direction from which the helicopter should approach. Skis normally will not fly away as the helicopter approaches.

Hazards of Extended Time on the Landing Zone

If the aircraft is ever parked on a snowy/icy surface for an extended period, the skids may freeze to the surface of the snow/ice. This is a dangerous situation, as it can lead to dynamic rollover of the helicopter during takeoff.

Flight For Life A-Star Adaptations for Winter Operations

Lifeguard 1 (Denver), Lifeguard 2 (Frisco), and Lifeguard 5 (Durango) have skis attached to their skids from the point at which snow depth is great enough (usually October or November) through the period at which snow depth does not warrant the skis (often March or April). The skis spread the helicopter's weight over the snowpack, and reduce the risk of the helicopter settling.

LANDING AND TAKING OFF IN SNOW

The pilot landing a helicopter on snow does not want to do a normal landing approach using forward flight to slowly transition into in-ground-effect. Instead, landings and takeoffs will be much slower operations in winter. The pilot will hold a high hover above the LZ to look at the LZ and evaluate the snow conditions.

The helicopter generally will enter the LZ in a full power vertical decent. Very slowly, the pilot will descend, pausing to blow snow out of the way. The pilot will stay in an out-of-ground effect hover while blowing the snow away. This is called a “point in space” approach. The pilot will terminate the descent during out-of-ground effect to blow away snow. The pilot will then slowly descend to in-ground-effect, and on to a landing.

Similarly, takeoffs will often be vertical—a maximum performance takeoff. This keeps the snow cloud smaller and keeps it in vicinity of the aircraft. It also allows the aircraft to clear high above any obstacles in or near the LZ.

APPROACHING A HELICOPTER IN WINTER OPERATIONS

For rescuers approaching and departing the helicopter, all equipment—such as skis, snowshoes and ice axes—must be carried horizontally below waist level, never upright or over the shoulder. Skis are especially dangerous, since skiers generally carry skis upright, over one shoulder.

Regardless of how nice the weather might be, rescuers should be sure to remove any baseball-style hats, secure other types of hats, fully zip jackets, put on gloves, and bundle tightly before approaching or departing a helicopter with rotors turning in winter. This is especially true for subjects that might be in a litter. At 0 degrees Fahrenheit, a 40 mile-an-hour rotor wash can make the effect on the skin feel like -30 degrees.

PART 8 | GENERAL HELICOPTER SAFETY

Rescuers on board a Flight For Life helicopter must be careful where they place their feet, hands and equipment. While strong and sturdy, these aircraft are lightweight and, therefore, fragile in some areas. As a result, a key principle is that if a door won't close or a buckle won't latch—don't force it. Everything on these aircraft is designed to move easily and freely.

DOORS, BELTS AND HELMETS

Safe and efficient operation of the doors, seatbelts and helmets is essential. Rotors turning at high velocity, combined with the pressure of a rescue operation, make it easy to lose track of how complicated these three key safety components are.

While skills demonstration of “doors, belts, and helmets” is part of the Lift Ticket, Avalanche Deployment and Rescue Deployment accreditations, rescuers should ideally be able to perform these tasks blindfolded.



Flight For Life doors open with a turn of the handle.
Photo courtesy Steve Wilson

Doors

As mentioned earlier, rescuers will generally enter and exit the aircraft from the left side facing forward (opposite the pilot).

Door handles are conventional, and intuitive in their operation... simply turn to open: the left side front door hinges forward, whereas the left side back door slides to the rear.

If the left rear sliding door is slid all the way back, it will latch in place so that the door does not inadvertently close during patient or rescuer loading. In order to close this door, one must release the latch before the door will slide forward to the closed position.



Undo this latch before trying to slide the sliding door closed.

Photo courtesy Steve Wilson

Emergency Exits

A-Star helicopters are equipped with many different emergency exits. Most windows can be easily pushed outward for exit in an emergency.

Rescuers must remember to follow the directions of the pilot/crew at all times in any emergency.



Most windows can operate as emergency exits.



Move the plastic guard and pull the orange handle to release the emergency exit window.

Photo courtesy Steve Wilson



The seat belt/harness is a four-point attachment with a twist-to-release buckle. *Photo courtesy Steve Wilson*

Seat Belts

The seat belt/harness is a four-point attachment with a twist-to-release buckle. Rescuers must loosen the shoulder straps (via the locking retractable system) and tighten the leg straps low across the hips.

Helmets

The Flight For Life helmets include twin visors, an earphone, microphone and oxygen supply hose.

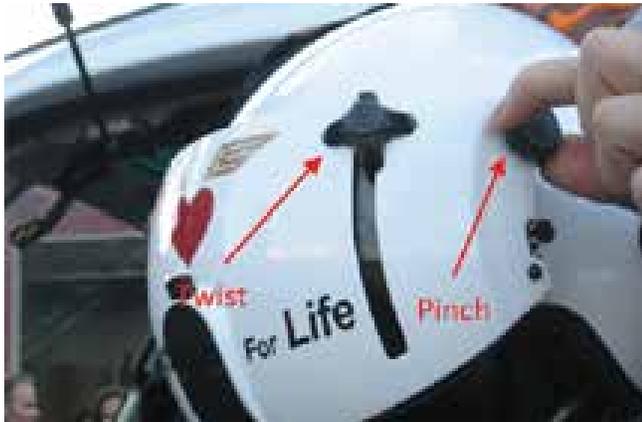


The Flight For Life helmets include twin visors, an earphone, microphone and oxygen system.

Photo courtesy Steve Wilson

Visors

There are two visors on the helmet: one clear and one tinted (the configuration may be different between helmets). One visor is lowered by a twist-style mechanism, the other via a pinch-style mechanism. The visors are compatible with eyeglasses or sunglasses.



One visor is lowered by a twist-style mechanism, the other via a pinch-style mechanism.

Photo courtesy Steve Wilson



The RIGHT side of the helmet chin strap is the ONLY side that should be used for securing and removing the helmet. *Photo courtesy Steve Wilson*

Straps

The RIGHT side of the helmet chinstrap is configured with a snap for easy attachment and removal of the chinstrap. This side is the only side that should be used for securing and removing the helmet.

The LEFT side of the Flight For Life helmet strap is threaded through the buckle, and is to be used for fit adjustment only. DO NOT unthread this left side of the strap to remove the helmet.

Microphone

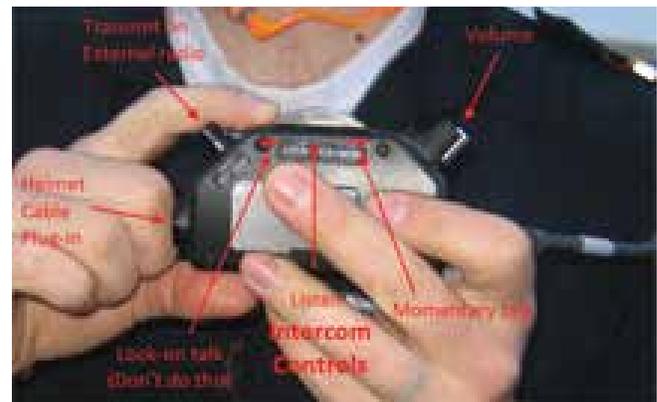
The microphone on the helmet must be in contact with your lips to function properly. It is referred to as a “KISS MIC” since one must essentially kiss the microphone for the voice activation (*aka* VOX) to be effective.

Oxygen Distribution

If oxygen becomes necessary, it will be provided via a tube located on the microphone boom. Rescuers need only ask the crew for assistance if they feel like they need oxygen.

COMMUNICATION

The microphone controller (or Carter Box) is usually located clipped onto a bracket on the ceiling of the aircraft. It can be used to talk to the crew/pilot via the intercom, or to outside entities via the aircraft’s air-to-ground radio (with the pilot’s permission).



The communications controller (*aka* “Carter Box”) can be used to talk to the crew/pilot via the intercom or to outside entities via the aircraft’s air-to-ground radio.

Photo courtesy Steve Wilson

Rescuers must keep the intercom toggle in the middle position and slide the toggle to the “momentary” position to speak. Sliding the toggle forward to the “lock” position will result in a “hot” microphone, meaning that the user’s mic will remain open at all times—an undesirable situation.

The round knob on the Carter Box is the volume control, and should be used to increase and decrease volume as needed.

Sterile Cockpit

During all operations, and whenever a rescuer is onboard the helicopter, rescuers and crewmembers must operate a “sterile cockpit.” This means they must eliminate all cockpit conversation, especially any chat that does not have a direct bearing on the flight operation. This includes any time the helicopter is in motion, on the helipad, at a landing zone, and while airborne. This is especially true during approaches, landings and takeoffs.

Cell Phones on Board

Due to the potential impact on avionics and communication systems, rescuers on board Flight For Life helicopters should either turn off their cell phones or, at a minimum, switch their phones to “Airplane Mode.”

HAND SIGNALS AT HELIPADS AND LANDING ZONES

In many circumstances, hand signals by qualified Ground Tenders can aid in communication between ground crew and the pilot and/or crewmembers.

In addition to radio communications, clear hand signals can eliminate the problems that have occurred during ground operations. Common hand signals are useful when combined with radio communications, because they are easy to understand, and more immediate in translation. For example, a helicopter on final approach can be quickly guided away from a hazard by “move left” or “move right” hand signals, avoiding the issues of misunderstood radio traffic. Working and training on hand signals in advance builds an important level of familiarity between Ground Tenders and helicopter crewmembers. The most commonly used hand signals can be found in Appendix A.



In addition to radio communications, clear hand signals can eliminate the problems that have occurred during ground operations.

EMERGENCY PROCEDURES

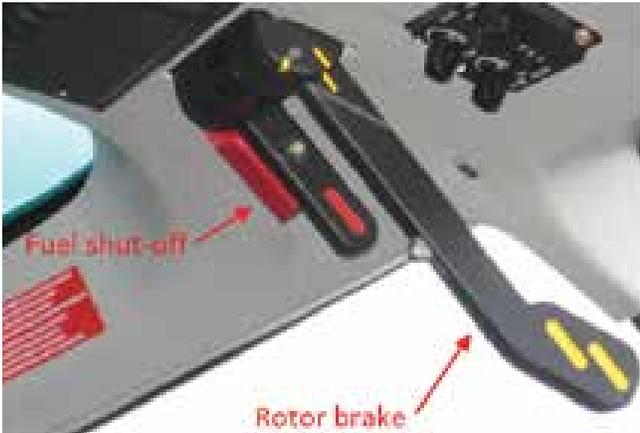
In the case of an emergency landing, the following cut-off systems need to be activated to reduce the risk of injury to rescuers and crewmembers:

1. Fuel shut-off
2. Rotor brake
3. Battery disconnect

Fuel Shut-off

For MOST of the Flight For Life aircraft, the fuel shut-off is in the front center of the aircraft, towards the ceiling. To engage the fuel shut-off, squeeze and pull the red handle in the direction of the rear of the aircraft.

For ONE of the Flight For Life A-Star helicopters (tail number N392LG), the fuel shut-off is at the left of the pilot, on the floor just left of the collective. To engage the fuel shut-off, squeeze and pull the red handle in the upward direction.



To engage the fuel shut-off in all but N392LG, squeeze and pull red handle in the direction of the rear of the aircraft. To engage the rotor brake, pull the yellow handle towards the rear of the aircraft.

Photo courtesy Steve Wilson



To engage the fuel shut-off in N392LG, squeeze and pull red handle in the direction of the rear of the aircraft.

Rotor Brake

Similarly, to engage the rotor brake, pull the yellow handle towards the rear of the aircraft. This will stop the main rotor, which will allow rescuers and crewmembers to exit the aircraft as quickly and safely as possible.

Battery Disconnect

Shutting off the battery will reduce the risk of an electrical fire during an emergency. The battery disconnect switch is the red button on the center console, to the left of the pilot.

CONCLUSION

Flight For Life's Lift Ticket, Avalanche Deployment and Rescue Deployment Programs have served an essential need to place rescuers at the scene of a SAR mission more quickly, saving lives in the process.

Of all the information to consider, the following are most important:

- Our number one concern is the safety of all rescue personnel involved in these calls. Flight For Life applies a rule called "Three to go; one to say NO." This means that all three persons on board must agree to the mission, and any person can abort the flight at any time.
- SAR members are required to attend an accreditation before being allowed to fly during any Flight For Life accredited program.
- SAR members flown by Flight For Life have numerous responsibilities, and should use the flight to develop situational awareness, formulate a plan and communicate to Incident Command before being dropped off.

ABOUT FLIGHT FOR LIFE COLORADO

Since its inception in 1972, Flight For Life Colorado has transported nearly 115,000 seriously ill or injured patients to the most appropriate destination for medical care.

As a nonprofit community resource, Flight For Life Colorado provides the finest in critical care and emergency transport for patients in Colorado and nine surrounding states, without regard for a patient's ability to pay, nor insurance status.

In 2013, in recognition of the limited financial resources available to Search and Rescue groups and out of respect for the tremendous commitment of the SAR community's volunteers in their training time and mission time, Flight For Life Colorado elected to no longer charge for rotor time or other expenses it incurs in this work. The only charges billed are to the patient or his insurer, in the event of a patient transport.

Your charitable contribution to Flight For Life Colorado saves lives. Your support is greatly appreciated.

ACKNOWLEDGEMENTS

This program would not have been possible without the effort of many members of the Flight For Life Colorado team and other leaders of the Colorado mountain rescue community. Our profound gratitude to those who provided content for this program, especially Kevin Kelble, vs; former Flight Paramedic, vs. : Flight for Life Colorado whose efforts formed the foundation for this guidebook.

We appreciate the assistance of many other contributors, including:

- **Dale Atkins**, former Mountain Rescue and Avalanche Representative to the International Commission for Alpine Rescue; past president, American Avalanche Association,
- **Chris Carr**, Flight For Life Flight Paramedic, Coordinator,
- **Major Tony Somogyi**, Colorado Army National Guard (COARNG),
- **Jeff Sparhawk**, 20-year veteran of Rocky Mountain Rescue Group,
- **Steve Wilson**, Incident Commander and 18-year veteran of Alpine Rescue Team,
- and a host of mountain rescue professionals, ski patrollers, helicopter pilots and crewmembers, and law enforcement professionals including **Brian Binge, Margaret DeLuca, Jeff Edelson, Jeff Girouard, Ric Ondrusek, Cale Osborn, Chris Sutton, Tony Trumbly** and **Dale Wang**.

APPENDIX A | HELICOPTER HAND SIGNALS



CLEAR TO START ENGINE

Make a circular motion above head with right arm



HOLD ON GROUND

Extend arms out at 45 thumbs pointing down



MOVE UPWARD

Arms extended sweeping up



MOVE DOWNWARD

Arms extended sweeping down



HOLD HOVER

Arms extended with clenched fists



CLEAR TO TAKE-OFF

Extend both arms above head in direction of take-off



LAND HERE, MY BACK IS INTO THE WIND

Extend arms toward landing area with wind at your back



MOVE FORWARD

Extend arms forward and wave helicopter toward you



MOVE REARWARD

Arms extended downward using shoving motion



MOVE LEFT

Right arm horizontal, left arm sweeps over head



MOVE RIGHT

Left arm horizontal, right arm sweeps over head



MOVE TAIL ROTOR

Rotate body with one arm extended



SHUT OFF ENGINE

Cross neck with right hand, palm down



WAVE OFF DO NOT LAND

Wave arms from horizontal to crossed overhead

SOURCE: Interagency Helicopter Operations Guide (IHOG) and National SAR Academy Training Manual

Flight For Life
Colorado

