

**COLORADO MOUNTAIN RESCUE
TEAM (CMRT)
TEIR 1 TRAINING
14 JUL 17**



COLORADO NATIONAL GUARD

CONG





HAATS

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AASF

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SAR Coordinators

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CW2 Clayton Horney

COARNG

SAAO

LTC Josh Day



TRAINING OVERVIEW

- **Tier 1 – Rescue Process / Equipment / Procedure Orientation**
 - Classroom training, hands-on aircraft orientation optional
 - Widest dissemination to all personnel involved in SAR / Disaster Relief
 - Aircraft immaterial

- **Tier 2 – Patient Packaging / Aircraft Loading / Hoist Operations**
 - Classroom training / dynamic dummy-load training with aircraft
 - Select rescue personnel as determined by rescue organization
 - Training recorded by person
 - Training conducted with 2 aircraft when available: UH-72, UH-60

- **Tier 3 – Rescuer Deployment / Recovery and Hoist Operations**
 - Select rescue personnel determined by COARNG
 - Recurring training required for currency
 - Training specific to airframe



AGENDA

- Request Process
- Mission Request Information
- Contact Information
- CONG SAR Structure
- Aircraft Overview
- Equipment Overview
- Rescue Procedure Overview
- Communications



CONG REQUEST PROCESS

○ Small Scale Event

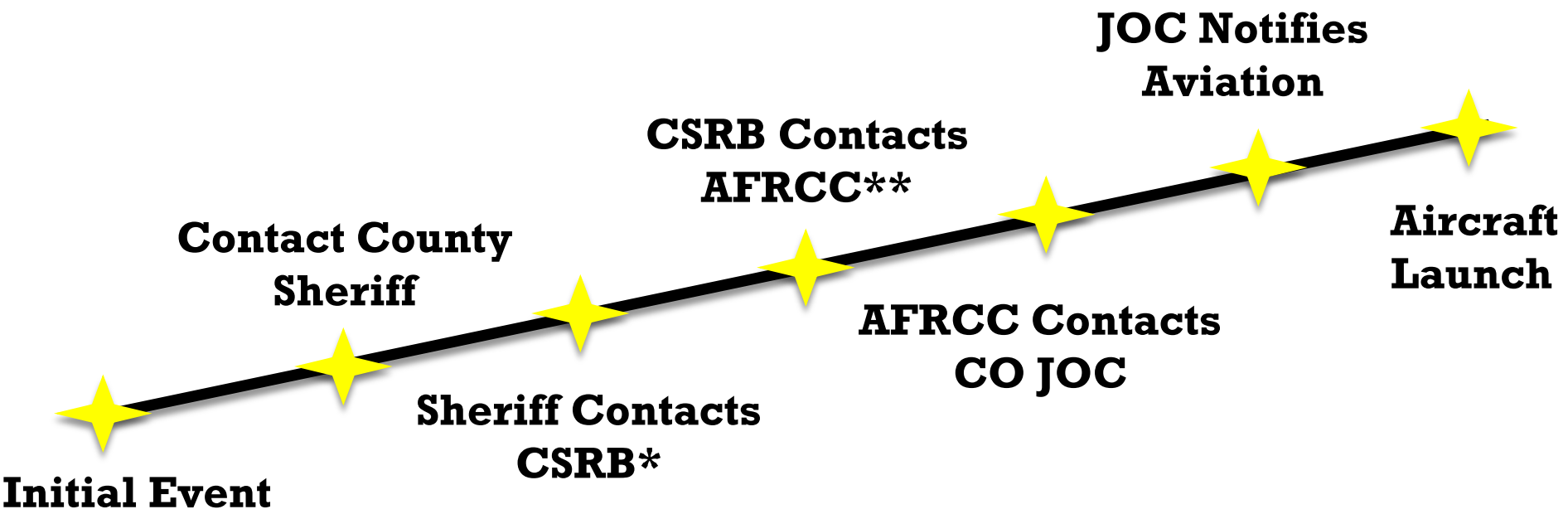
- Search and Rescue
- Team Insertion / Extraction

○ Large Scale Event

- Flood
- Blizzard
- Wild Fire
- Mud Slide



SMALL SCALE REQUEST PROCESS

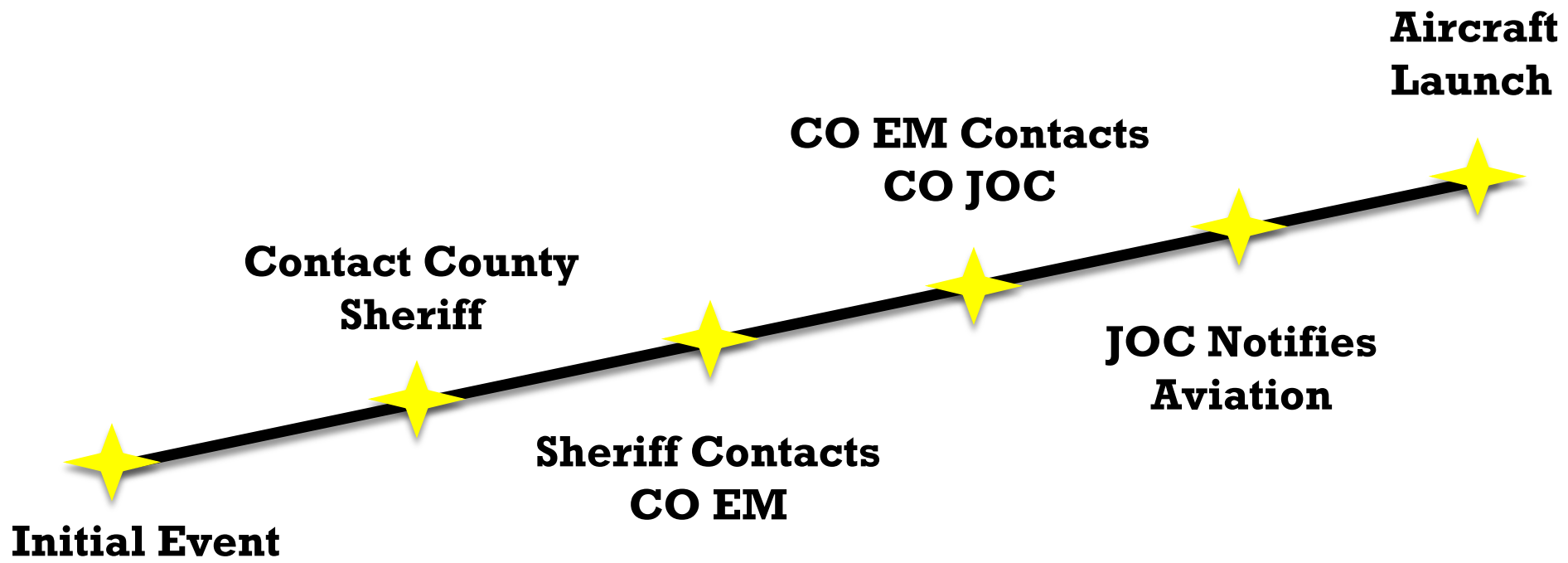


*Encouraged by not required

**AFRCC approval negates charges to county



LARGE SCALE REQUEST PROCESS





Wild Land Firefighting SAR Support

● City or County Managed Fire

- Sheriff contacts AFRCC

● State or Federal Managed Fire

- Without pre-coordinated support SAR aircraft
 - County Sheriff contacts AFRCC
- With pre-coordinated support SAR aircraft
 - IC has aircraft launch authority



Mission Request Information (If Available)

- Location (dd mm.mm)
- Elevation
- Patient Information
- Rescue Situation
- Required Equipment
- ICP Location (If applicable)
- Communications Plan
 - Interoperable Channel
 - DTR, if available for long range communication
 - Direct frequency required for on-scene
- Weather Conditions
 - Temperature if known
- Obstacles



Contact Information

- **County Sheriff Department**

- 911

- **Colorado Search and Rescue Board (CSRB)**

- (800)-593-2772
- **Contacted by County Sheriff**

- **Air Force Rescue Coordination Center (AFRCC)**

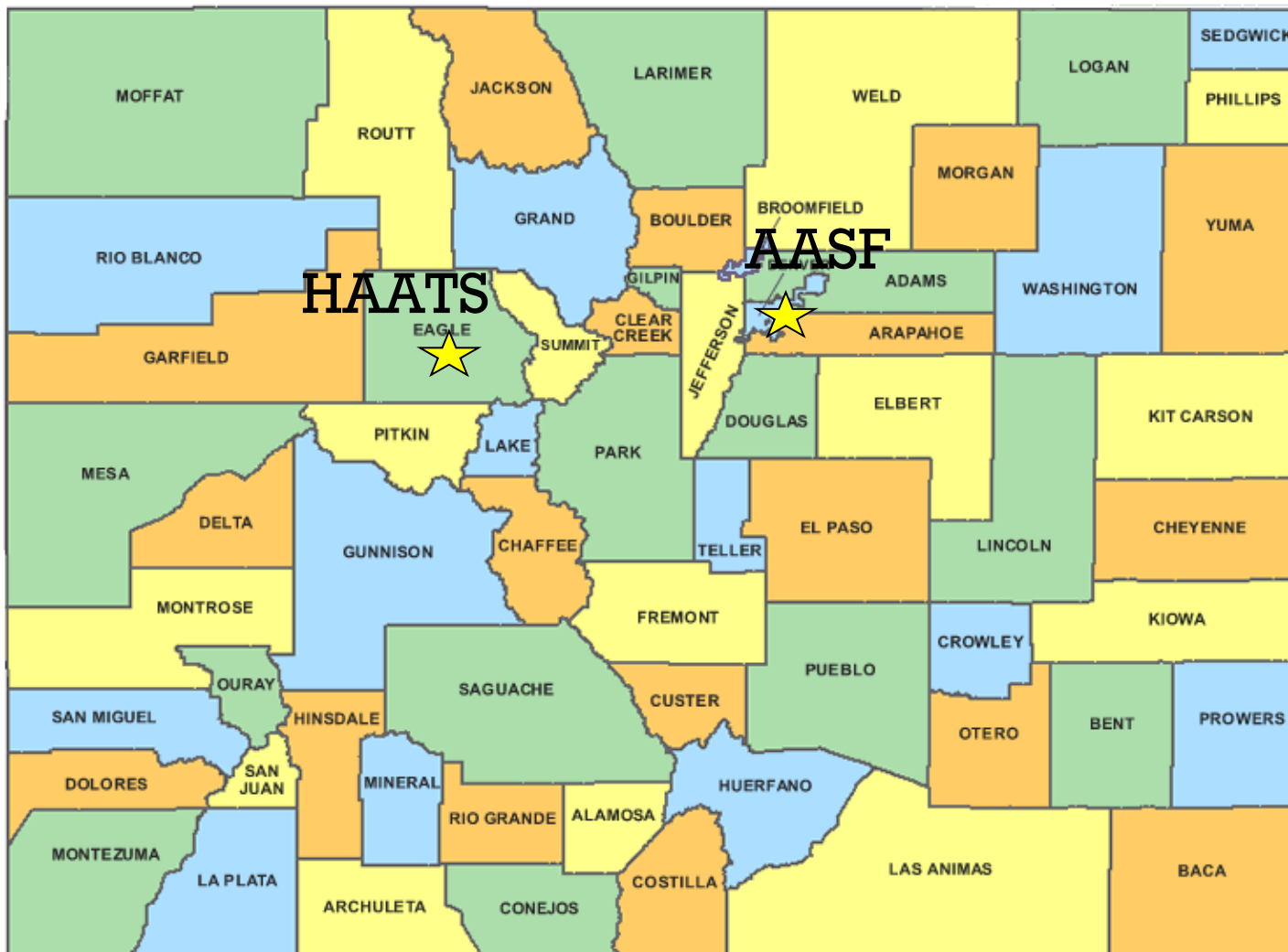
- (850)-283-5955
- **Contacted by CSRB after notification by County Sheriff**

- **Colorado Department of Emergency Management (COEM)**

- (303) 279-8855
- **Contacted by County Sheriff**



CONG SAR AVIATION OVERVIEW





CONG Aviation Crew Makeup

- 2 x Pilots

- 1-2 x Crew Chief / Flight Engineer

- 1 x Flight Medic (Mission dependent)
 - Minimum Medical Training – Paramedic



CONG AIRCRAFT OVERVIEW

- UH-72A Lakota
- UH-60L Blackhawk
- CH-47F Chinook



UH-72A Lakota (EC-145)

- 7 Aircraft – 4 MEDEVAC w/ external hoist, 3 Slick w/o hoist
 - HAATS – 3
 - AASF - 4
- Dual engine, rated at 738 SHP each
- Four-bladed, “fully rigid” hinge less rotor system
- 7903 lbs max take-off weight
- 600 lbs max hoist load
- 295 ft (approximately) usable hoist cable length



UH-72A Lakota (EC-145)

Usage:

- Search and rescue
- Command and control
- Confined area extraction
- LZ operations up to 14,000* ft w/ small load
- Hoist operations below 10,000* ft
- Lowest per hour operating cost

* PIC makes final determination, specific conditions may increase or decrease aircraft capabilities



UH-72A Lakota (EC-145)

**UH-72A
Lakota**

**DANGER
AREAS**

The diagram illustrates the danger zones of a UH-72A Lakota helicopter. A top-down view shows the main rotor blades with a 36-foot 1-inch diameter. A red shaded area around the tail rotor is labeled "Hot Exhaust". A side view shows the main rotor blades with a 11-foot 4-inch turning height and a 10-foot 2-inch static height. The tail rotor is shown with a 6-foot 6.5-inch height. A red shaded area around the tail rotor is also labeled "Hot Exhaust".

Hot Exhaust

36' 1"

Always avoid the tail rotor area. The blades are close to the ground and nearly invisible when running.


Hot Exhaust

11' 4" Turning

10' 2" Static

6' 6.5"

If the engines of a UH-72A are still running, approach the aircraft from the front at a 45 degree angle and always keep the pilot in view.

QR code: 

U.S. ARMY COMBAT READINESS/SAFETY CENTER
<https://safety.army.mil>



UH-72A Lakota (EC-145)

UH-72A Lakota
PASSENGER BRIEFING CARD

3 O'CLOCK RIGHT SIDE

12 O'CLOCK NOSE

9 O'CLOCK LEFT SIDE

6 O'CLOCK TAIL

Danger Rotor Blades

Danger Tail Rotor

Passengers Approach Aircraft from 3 and/or 9 O'Clock Position

CREW ENTER EXIT

CAUTION: DO NOT INFLATE INSIDE AIRCRAFT

Seatbelts
FASTEN UNFASTEN

Crash Position

Weapons (Pointing Down)

All Military Personnel - ID Tags Required

Hearing Protection

In the event of an anticipated emergency water landing individual flotation devices are located under the seat.

In the Event of an Emergency Landing or Crash, Assemble at the 3, 9, 12 or 6 O'Clock Positions if Safe to do so.

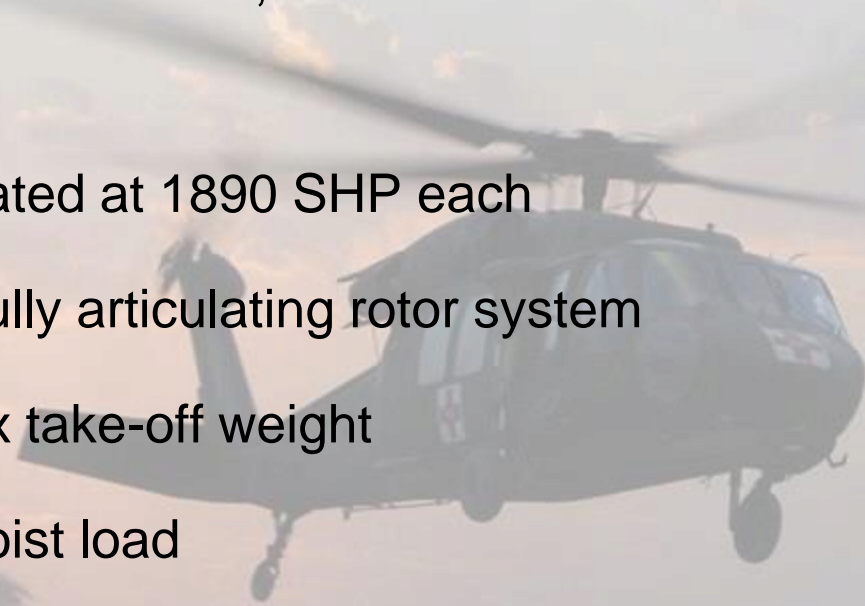
Scan for UH-72A Lakota PAX Briefing

U.S. ARMY COMBAT READINESS/SAFETY CENTER
<https://safety.army.mil>



UH-60L Blackhawk

- 16 aircraft – 8 MEDEVAC, 8 Slick w/ hoist
 - HAATS – 4
 - AASF - 12
- Dual engine, rated at 1890 SHP each
- Four-bladed, fully articulating rotor system
- 23,500 lbs max take-off weight
- 600 lbs max hoist load
- 250 ft (approximately) usable hoist cable length
- Single cargo hook rated at 8000 lbs





UH-60L Blackhawk

Usage:

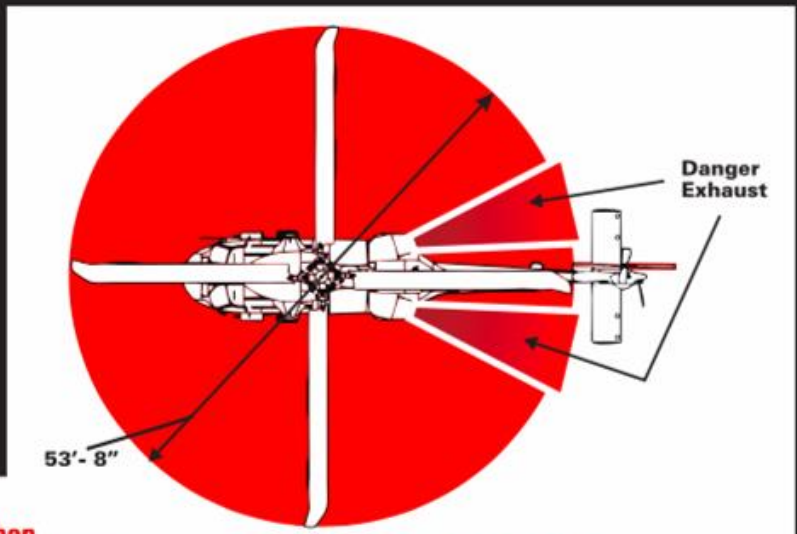
- Search and rescue
- Command and control
- LZ operations up to 14,000* ft w/ medium load
- Hoist operations below 12,000* ft
- Moderate per hour operating cost

* PIC makes final determination, specific conditions may increase or decrease aircraft capabilities

UH-60L Blackhawk

**UH-60A/L/M
 Black Hawk**

**DANGER
 AREA**



WARNING: Use extreme caution when approaching a running aircraft. The main rotor blades can dip as low as four feet above the ground, lower on sloped terrain.

Always avoid the tail rotor area. The blades are close to the ground and nearly invisible when running.



WARNING: If the engines of a UH-60 are still running, approach the aircraft from the front at a 45 degree angle and always keep the pilot in view.



UH-60L Blackhawk

UH-60A/L/M Black Hawk
PASSENGER BRIEFING CARD

3 O'CLOCK RIGHT SIDE

9 O'CLOCK LEFT SIDE

12 O'CLOCK NOSE

6 O'CLOCK TAIL

Danger Rotor Blades

Danger Tail Rotor

Exhaust

Passengers Approach Aircraft from 3 and/or 9 O'Clock Position

Passengers Approach Aircraft from 3 and/or 9 O'Clock Position

VIEW LOOKING FORWARD

Seat belts

Weapons (Pointing Down)

Hearing Protection

Crash Position

All Military Personnel - ID Tags Required

Cabin Door Window Jettison Lever Looking Outboard Left Side (Same for right side)

Open Position
Unlocked Position
Locked Position

Forward

Some Armed Units, if Attached by Crew

CREW ENTER EXIT

CREW ENTER EXIT

Exit

Exit

Exit

Exit

First Aid Kit

First Aid Kit (Cabin)

Fire Extinguisher (Cabin)

Fire Extinguisher (UH-60M)

Crash Ax

Battery

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<https://safety.army.mil>

Scan for UH-60 Black Hawk FAX Briefing

In the event of an emergency landing or crash, assemble at the 3, 9, 12 or 6 o'clock positions if safe to do so.



CH-47F Chinook

- 7 aircraft
 - HAATS – 2
 - AASF – 5
- Dual engine, rated at 4733 SHP each
- Tandem three-bladed, fully articulating rotor system
- 50,000 lbs max take-off weight
- Litter patients must be hoisted in the vertical configuration
- Triple single cargo hooks rated at 26,000 lbs



CH-47F Chinook

Usage:

- LZ operations up to and above 14,000* ft w/ large load
- High per hour operating cost

* PIC makes final determination, specific conditions may increase or decrease aircraft capabilities



CH-47F Chinook

CH-47D/F Chinook

DANGER AREAS

Blade Rotation

Hot Exhaust

60'

Hot Exhaust

4' 4" Static

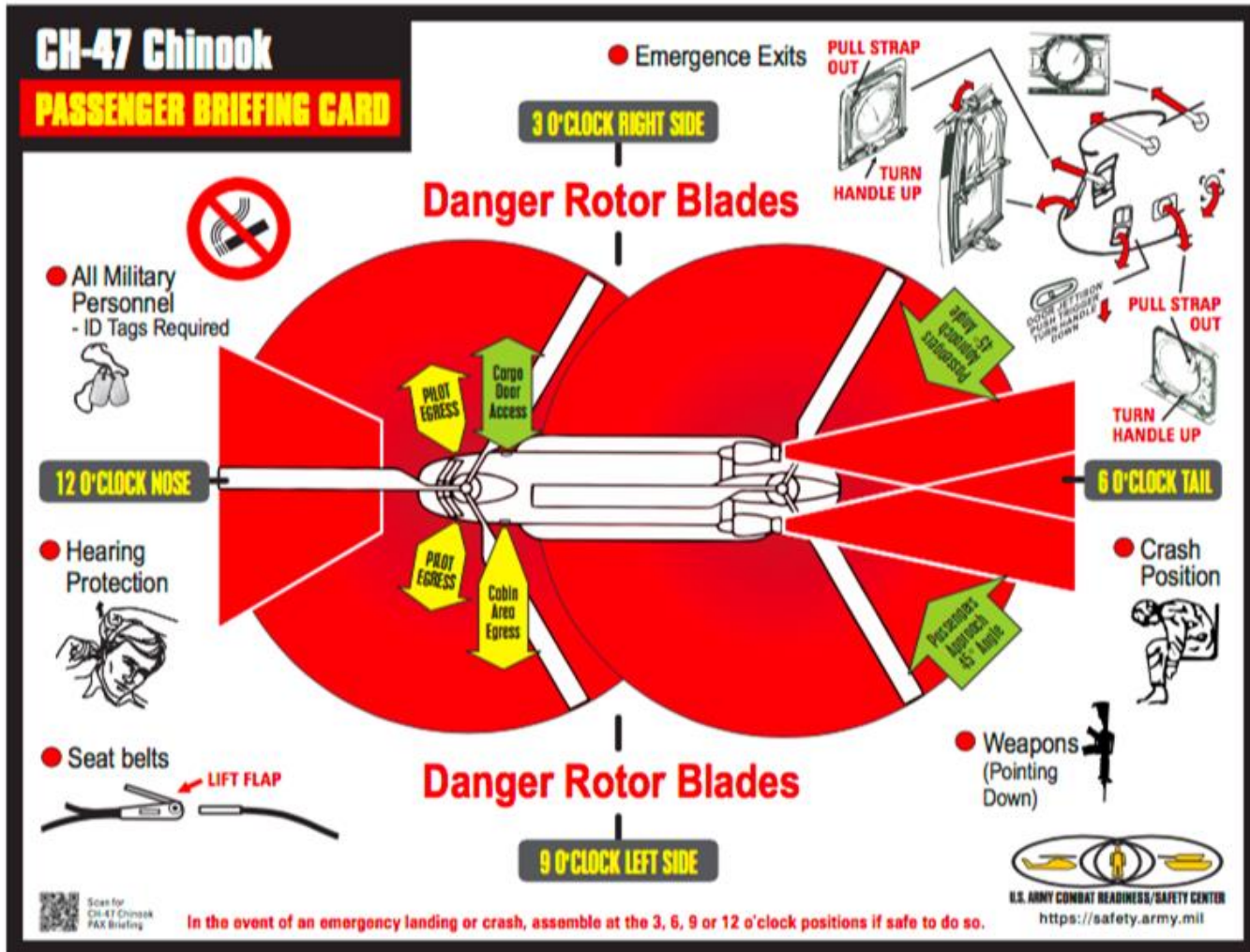
Use extreme caution when approaching the aircraft. Due to low rotor clearance, never approach the nose of aircraft. The main rotor blades can dip as low as four feet above the ground, and lower in gusty winds or on sloped terrain.

U.S. ARMY COMBAT READINESS/SAFETY CENTER
<https://safety.army.mil>

The diagram is enclosed in a black border. In the top left, a red box contains the text "CH-47D/F Chinook" and "DANGER AREAS" in white. To the right, a top-down view of the helicopter's rotors is shown with red circular areas representing danger zones. Labels include "Blade Rotation" with arrows pointing to the rotor blades, "Hot Exhaust" with arrows pointing to the exhaust plumes, and "60'" indicating the radius of the danger areas. Below this, a side profile of the helicopter shows red trapezoidal areas representing danger zones extending from the main rotor hub and the tail rotor. A label "Hot Exhaust" points to the tail rotor area, and "4' 4" Static" indicates the height of the main rotor danger zone. At the bottom, a QR code is on the left, a safety warning is in the center, and the U.S. Army Combat Readiness/Safety Center logo and website are on the right.



CH-47F Chinook





RESCUE EQUIPMENT OVERVIEW

- TRI-SAR / Triton Harness
- Quick Strop
- Jungle Penetrator / Rescue Seat
- Stable Flight Heli-Bag
- Stokes Litter
- Tag Line



TRI-SAR Harness

- Worn by Rescuer
- Rescuer can ride with:
 - Ambulatory Patients
 - Litter Patients
- Used in conjunction with strop or litter system





Quick Strop

● Ambulatory Patients

- Conscience
- Cooperative

● With or without Rescuer





Rescue Seat

● Ambulatory Patients

- Conscience
- Cooperative



● Use

- UH-60
- UH-72





Stable Flight Heli-Bag

- All Aircraft
- Can be used with or without Rescuer
- Requires structure
 - Stokes Litter
 - Back Board
 - Vacuum Splint
- Does not requires Tag Line
- Compact for delivery and ground movement





STOKES LITTER

- Used primarily by the UH-60
- Can be used with or without Rescuer
- Can be broken down for delivery
- Requires Tag Line
- Does not require backboard / litter for structure





TAG LINE

- Used with litter patients to prevent load spinning
- Connected to foot end of litter
- Disconnect by crewmember and left on scene once litter is brought into aircraft





RESCUE PROCEDURES

- LZ / PZ Selection
- Aircraft Hazards
- Hand and Arm Signals
- Patient Packaging
- Hoist Operations
- Tag Line Management
- Night Operations



LZ / PZ SELECTION

● LZ Size:

- UH-72A – 75 ft
- UH-60L – 100 ft
- CH-47F – 150 ft

● Slope Limitations:

- < 5 deg - All Aircraft
- 5 – 10 deg – Possible

● Obstacles

● Snow / Dust



AIRCRAFT HAZARDS

○ Downwash

- Increases with aircraft weight
- Capable of dislodging personnel and equipment on steep terrain
- Dead fall / Debris danger

○ Tail Rotor

- Do not operate near the tail rotor on the UH-60 and UH-72
- High RPM rate makes the tail rotor difficult to see



AIRCRAFT HAZARDS

● Main Rotor

- Verify clearance when operating on sloped terrain
- Approach from 3 or 9 o'clock position or as directed by the flight crew for UH-60 and UH-72
- Approach as directed for CH-47
- Ensure equipment clearance when operating under / near rotor system (Litters / Antennas)
- Ensure rotor / tag line clearance on sloped terrain



HAND AND ARM SIGNALS

Ready for Lower

(Used for hoist hook, Tag Line, Litter, Jungle Penetrator, or equipment)



Cable Down

Cable Down



Cable Down Slowly

(Given when within 5' of the ground)



Stop Cabling



Ready to Lift/ Raise



Abort





HOIST OPERATIONS

- **Types of COARNG Operations**
 - Empty hook delivery / patient recovery
 - COARNG Crewmember deployment / recovery
 - Rescuer delivery / recovery with patient (Tier 3)

- **Allow hook to contact the ground to discharge static electricity**

- **Any excess hoist cable must be managed to prevent danger to ground personnel**

- **Less than 150 ft cable length preferred**



1 Wheel / Skid

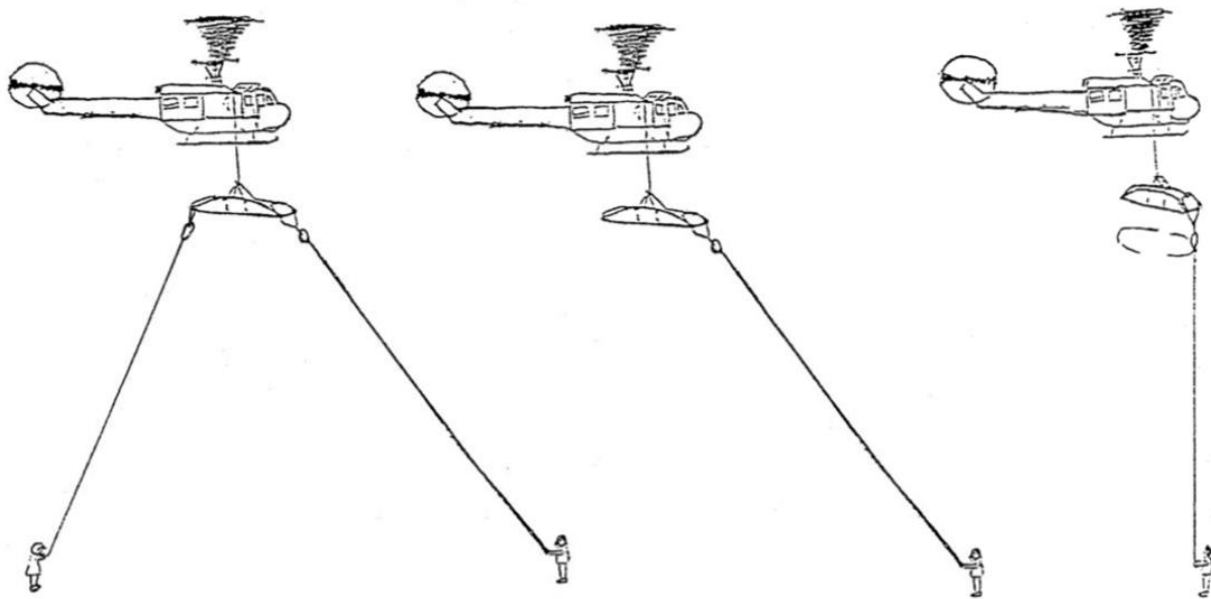
Operations

- Used on excessive slopes or for less than required LZ size
- Less dangerous than hoist operations
- Aircraft is less stable during loading / unloading than normal LZ / PZ operations
- Verify personnel clearance from main and tail rotor on upslope during loading



TAG LINE MANAGEMENT

- Setup on 45 deg angle from aircraft
- Requires gloves
- Maintain control through rope tension





Night Operations

- Higher risk for hoist and LZ operations
- Extraction may be delayed for daylight if patient / situation is stable
- Excess hoist cable management is critical
- Use of ground / aircraft supplemental lighting is encouraged
- Chemlight will be affixed to the hoist hook



COMMUNICATIONS

- Radio communication with ground crew strongly encouraged

- Direct (Non-repeated) for rescue scene
 - Repeater coverage may not be available at PZ

- Choose interoperable channel

- Given no communication plan, CONG aircraft will arrive on 155.160 (MRA1)



Questions

