

# Mine Resistant Ambush Protected (MRAP) MaxxPro Dash ISS with MaxxPro Survivability Upgrades (MSU) Emergency Rollover/Egress Procedures

20 August 2013

These procedures provide MaxxPro crews with the steps necessary for conducting rollover drills and the procedures for conducting egress from a MaxxPro after a rollover event. Rollover and egress drills must be practiced regularly in daylight and limited visibility conditions. In training, additional conditions to consider are assessing casualties, blocked doors or hatches requiring egress from less than optimal egress points, enemy presence, and simulated bodies of water.

## SECTION I – PREVENTING ROLLOVERS AND ROLLOVER RELATED INJURIES

- 1. USE RESTRAINT SYSTEMS - SURVIVE THE ROLLOVER!** Always wear your seatbelt. In the event of an accident or explosion, seatbelts can prevent users from being thrown around in the vehicle, or gunners being ejected from the vehicle mitigating injury. The Jankyl seat headrest is designed to prevent extension of the neck during a blast or rollover. It must be installed at all times during operation.
- 2. SLOW DOWN.** Speed is the factor over which the driver can exercise the most control. Faster speeds decrease driver response times and increase the potential for a rollover. This is especially true when maneuvering through curves, on steep slopes, or dealing with sudden traffic situations.
- 3. MAINTAIN CONTROL OF THE VEHICLE - AVOID PANIC.** When a MRAP goes off a road, it can overturn if the operator overcorrects or jerks the steering wheel. Don't panic - if you drive off the roadway, gradually reduce speed and ease the vehicle back onto the roadway at a safe speed – NEVER jerk the steering wheel as this is a significant source of rollovers. If the vehicle is traveling at a significant speed, it may even be safer to continue in the path of travel off the road until the vehicle has slowed down enough to safely return to the road.
- 4. SECURE THE LOAD.** All equipment inside the vehicle must be secured IAW the unit load plan. Load and secure heavier items low in the MaxxPro. Unsecured loads can become deadly projectiles. Improperly secured loads can change a vehicle's center of gravity and its stability. Do not stow material under seats. Under-seat area is not designated for stowage, and improper use may lead to seat failure during a blast event. Failure to comply will result in death or injury to personnel.
- 5. MAINTAIN THE VEHICLE.** It is critical that the MaxxPro be in good operating condition before starting your mission. Perform Preventive Maintenance Checks and Services (PMCS). Pay particular attention to tire condition and air pressure. Ensure the Central Tire Inflation System (CTIS) is set to the type of terrain you are operating in. Worn and improperly inflated tires increase risk of rollover. Refer to the operator's manual for proper tire inflation pressures and speeds.
- 6. WORK AS A TEAM TO IDENTIFY HAZARDS.** While vehicle commanders must assist the driver in identifying road hazards such as road obstacles, potholes and soft shoulder roads, all crew members must work as a team and let the driver know what is to the left, right, rear, and overhead. Know and cover the MaxxPro's dead space/blind spots. When visibility is restricted and the tactical situation permits, use ground guides.
- 7. COMMUNICATE.** Use the vehicle intercom system to pass information to the driver, but rehearse shouted voice commands and hand signals in case the intercom is inoperative. Transmit road hazard information to all vehicles in the convoy.
- 8. COMBAT DOOR LOCKS.** Keep combat locks engaged. Combat door locks keep the enemy out and prevent the doors from opening in the event of an accident or explosion. Know the locations of your combat lock tool in each MaxxPro and rehearse their use. If you have other types of MRAPs in your patrol, know where the combat lock tool is located for those MRAPs as well.

#### NOTE

Combat locks may slow egress and rescue if the vehicle rolls into water. It may be feasible to ensure combat locks are in the unlocked position prior to fording. Leaders must evaluate this risk during mission planning.

9. **REHEARSE EGRESS.** Constantly rehearse egress drills as a team. Ensure all personnel fully understand the vehicle's egress points and operation of doors, combat locks, VEE windows and gunner hatch. Plan for the worst case scenario; rehearse vehicle evacuation as if only one exit is available. Removal of body armor and other equipment may be required when moving from the front of the cab to the rear of the cab or vice versa to egress from the vehicle. This should be identified and practiced during rehearsal. Check your operator's manual for specific procedures for the various configurations and mission loads.

## SECTION II – ROLLOVER/EGRESS PROCEDURES

#### WARNING

**NEVER ATTEMPT TO LEAP FROM A ROLLING VEHICLE. IT MAY ROLL OVER YOU. ENSURE THAT THE VEHICLE HAS STOPPED MOVING BEFORE ATTEMPTING TO EGRESS.**

#### EXECUTE ROLLOVER DRILL

##### 1. Driver

- Release the accelerator
- Steer into direction of the roll
- Yell, "Rollover, Rollover, Rollover!"
- Keep hands on the steering wheel with extended and unlocked arms, tuck head and chin into chest and brace for impact

#### NOTE

If rollover into water is imminent, all crew members yell, "Water, Water, Water!" instead of "Rollover, Rollover, Rollover!"

#### WARNING

**CAUTION SHOULD BE USED IN "PULLING GUNNER INTO CAB" BECAUSE INADVERTENT CONTACT WITH QUICK RELEASE MECHANISM COULD DISCONNECT THE GUNNER'S HARNESS FROM THE RESTRAINT SYSTEM'S FLOOR MOUNTED LOWER RETRACTOR.**

##### 2. Vehicle Commander

- Yells, "Rollover, Rollover, Rollover!"
- Pulls gunner into cab (if applicable/able) avoiding contact with pelican clip release tab.
- Tucks head and chin into chest and braces for impact.
- Plants feet firmly on the floor while holding onto stationary object.

##### 3. Gunner ( if applicable)

- Yells, "Rollover, Rollover, Rollover!"
- Drops down from the hatch into the vehicle.
- Tucks head and chin and braces for impact while holding onto stationary object.

##### 4. All Personnel

- Yell, "Rollover, Rollover, Rollover!"
- Pulls gunner into cab (if applicable/able) avoid contact with pelican clip release tab
- Tuck head and chin into chest and brace for impact.
- Plant feet firmly on the floor while holding onto a stationary object.

## **AFTER ROLLOVER HAS STOPPED**

5. Driver, All personnel
  - Driver shuts down engine
  - Driver raises and secures Driver Vision Enhancer to stowed position. (If applicable)
  - All personnel disconnect headsets
  - Personnel release seat restraints; use caution if upside down
  - Unlock combat door locks (if applicable). Exit vehicle
  - Assess injuries (Address potential for post crash fire [if applicable])
  - Assist other personnel to exit and secure weapons
  - Establish security
  - Account for personnel
  - Provide first aid
  - Account for weapons, ammunition and sensitive items.
  - Assist in vehicle recovery.
  - Report mishap to higher headquarters and request help and/or recovery as required.

## **SEAT BELT CUTTERS**

Seat belt cutters can be used in an emergency to cut through seat belts, gunner restraints, clothing, belts, footwear, and RPG nets. After a rollover has stopped, crew members or emergency responders can cut away restraints that have failed to operate properly to allow egress.



## **EMERGENCY EGRESS TOOLS / UNIVERSAL COMBAT LOCK TOOLS**

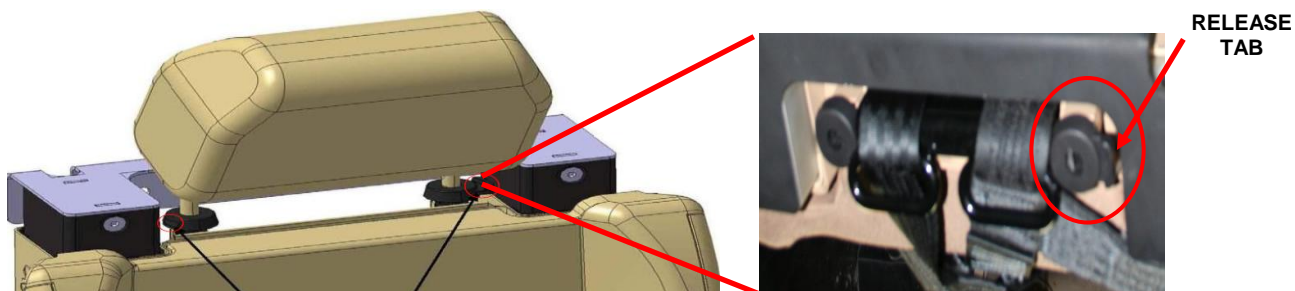
Universal Combat Lock Tool allows you to release any MRAP vehicle's combat locks from outside the vehicle.

- All vehicle occupants must know where and how to operate all door locks, latches, and hatches on their vehicle.
- All vehicle occupants must know where their vehicle egress tool is located and rehearse their use as part of mission preparation.



## JANKYL SEAT HEADREST

- JANKYL seat headrest can be removed by pushing the release tab on the left side
- The release tab releases the headrest to allow adjustment or removal



### WARNING

THE MAXXPRO JANKYL SEAT HEADREST IS DESIGNED TO PREVENT EXTENSION OF THE NECK DURING A BLAST OR ROLLOVER. IT MUST BE INSTALLED AT ALL TIMES DURING OPERATION.

### WARNING

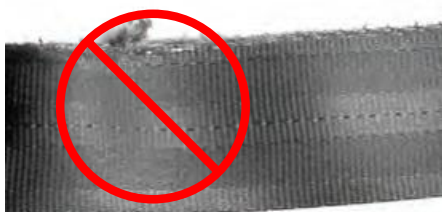
ITEMS SHOULD NOT BE STOWED UNDER THE SEAT AT ANY TIME. ITEMS STOWED UNDER THE SEAT WILL LIMIT THE STROKE OF THE SEAT DURING A BLAST EVENT. FAILURE TO COMPLY MAY RESULT IN SERIOUS INJURY OR DEATH TO PERSONNEL.

## GUNNER RESTRAINT SYSTEM

The Gunner Restraint System (GRS) and Improved Gunner Restraint System (IGRS) are used to prevent the gunner from being ejected from the interior of a vehicle and injured or killed. The systems are designed for quick removal and are designed to be worn on the **OUTSIDE** of the IOTV.

Thoroughly inspect all seat belts and gunner restraint systems for damage before each use.

- Do not use a belt/harness that is cut, frayed, torn, ripped, or otherwise damaged.
- Do not use a GRS belt that has been in any type of accident (even if it shows no signs of damage).



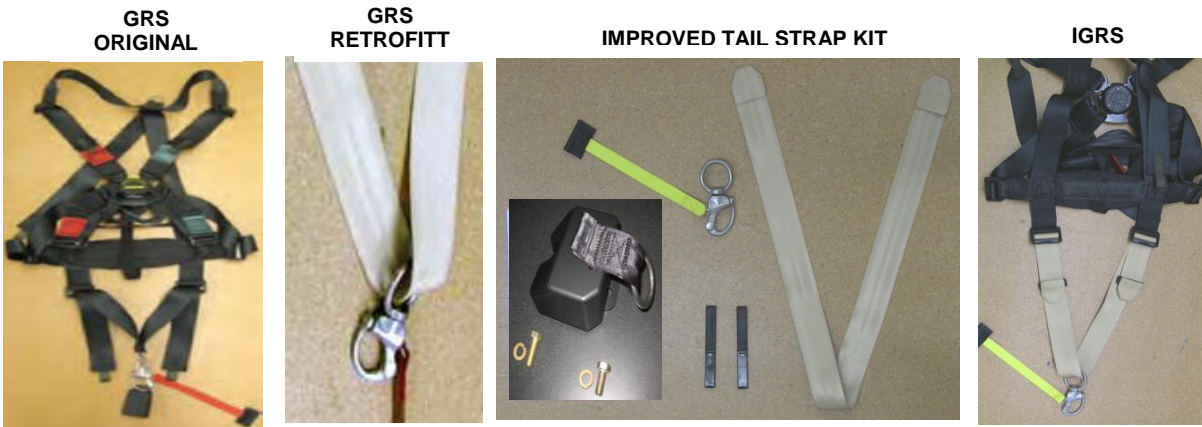
FRAYED



WORN / STRETCHED

## GRS / IGRS COMPONENTS

- GRS is identified by a black tail and a D-ring (NSN 3120-01-567-5530)
- Retrofitted GRS is identified by a tan tail and red lanyard (NSN 2450-01-593-5363)
- IGRS is identified by a tan tail and yellow lanyard (NSN 2540-01-597-6306)



The IGRS has many benefits, including better quick-release connections between the harness and retractor. Thus, units should upgrade to full IGRS replacement as soon as possible. The IGRS is not an issued item; units must order it through their supply channels.

#### **PROPER FITTING OF THE GRS**



- To put on the harness, orient it by locating the upper D-ring and loosen all adjustable straps to their full length.
- Bring the upper straps over the shoulders ensuring that the red strap is on the right and the green is on the left.
- Locate the quick release rotary buckle and bring through the legs to the low point of the abdomen.
- Connect the vertical anchor strap to the rotary buckle device on the harness. Ensure that the red strap is on the right and the green is on the left.
- Connect the lower anchor strap to the rotary device on the harness ensuring the red strap is on the right and the green is on the left.



### WARNING

**NEVER MODIFY, DISASSEMBLE, OR ATTEMPT TO REPAIR THESE RESTRAINT SYSTEMS. DOING SO CAN REDUCE THEIR EFFECTIVENESS AND CAN CAUSE SERIOUS PERSONAL INJURY OR DEATH IN AN ATTACK, COLLISION OR ACCIDENT. OCCASIONALLY CHECK RESTRAINT CONNECTION. STEPPING ON THE QUICK-RELEASE LANYARD ACCIDENTALLY COULD DISCONNECT THE GUNNER FROM RESTRAINT WITHOUT HIS/HER KNOWLEDGE.**

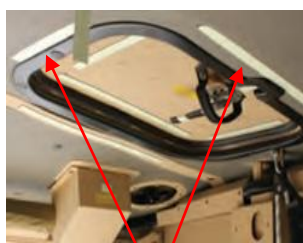
### EGRESS MARKINGS

Photoluminescent tape is a high performance rechargeable luminous film used for safety and emergency exit "glow in the dark" signage and markings. Egress markings can assist in identifying egress points and orient passengers in low-light and no-light conditions.

- Place luminous tape on ALL interior combat lock mechanisms and handles
- Mark all roof hatches leading to egress
- Mark rear door/ramp exits



COMBAT LOCK AND HANDLES



ROOF EGRESS HATCH



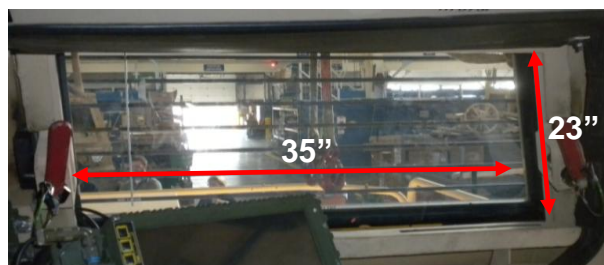
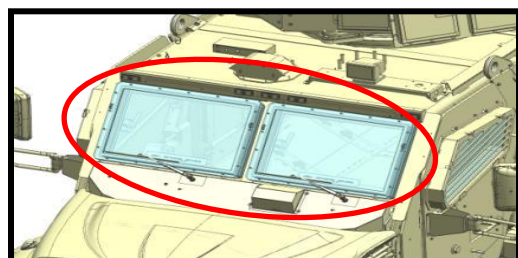
REAR DOOR/RAMP EXIT

### VEHICLE EMERGENCY EGRESS (VEE) Window

VEE windows allow crews to remove the front ballistic windows of the MaxxPro and quickly exit the vehicle during an emergency

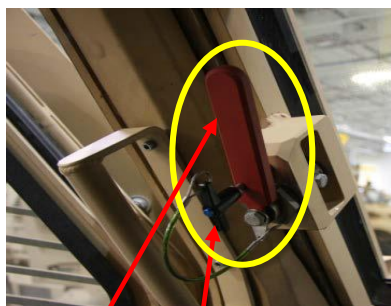
### WARNING

**EACH VEE WINDOW WEIGHS 287 LBS. USE CAUTION WHEN REMOVING VEE WINDOWS. IF VEHICLE IS ON ITS SIDE, REMOVE THE WINDOW FURTHEST FROM THE GROUND FIRST (TOP WINDOW). WHEN EGRESSING FROM THE VEE WINDOWS WITH RPG NETS INSTALLED, AFTER YOU DISENGAGE (KICK) THE WINDOW, BE PREPARED TO USE YOUR SEAT BELT CUTTER TO CUT THE NET. WINDOW MAY GET CAUGHT IN THE NET MAKING IT DIFFICULT TO EGRESS.**



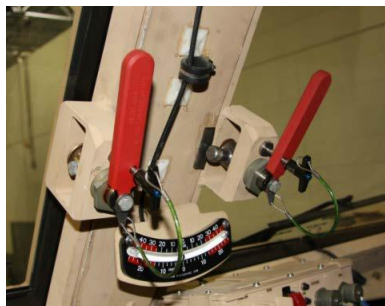
## EGRESS FROM DRIVER/COMMANDER VEHICLE EMERGENCY EGRESS (VEE) WINDOWS

- Push in the release button on T-pin
- Pull T-pins from left and right side release handles
- Rotate **RED** locking levers inward toward middle of the window and down



RELEASE  
HANDLE

T-PIN



T-PIN INSTALLED

T-PIN  
RELEASE  
BUTTON



T-PIN REMOVED

- Kick the **TOP** of the window away from the truck.
- Tilt steering wheel in up position when egressing from driver side of vehicle.
- Egress through window.

### WARNING

**WHEN EGRESSING FROM THE VEE WINDOWS WITH RPG NETS INSTALLED, THE REMOVAL OF PERSONAL GEAR MAY BE REQUIRED TO ALLOW PASSAGE THROUGH WINDOW OPENING. IF NECESSARY, SOLDIERS SHOULD EGRESS WITH THEIR GEAR IN HAND WHILE IN TACTICAL CONDITIONS.**

## MAXXPRO DASH RAMP OPERATION

### WARNING

**ENSURE (BY LOOKING OUT ONE OF THE SMALL REAR WINDOWS OR VEHICLE MIRRORS) THAT NO ONE IS BEHIND THE VEHICLE WHEN LOWERING THE REAR DOOR/RAMP. DO NOT OPERATE THE REAR DOOR/RAMP WHEN VEHICLE IS IN MOTION. USE EXTREME CAUTION WHEN USING THE EMERGENCY REAR DOOR/RAMP RELEASE TO ENSURE THAT NO ONE CAN BE STRUCK BY THE DOOR AS IT FALLS OPEN. SOUND HORN BEFORE LOWERING DOOR/RAMP. KEEP ARMS AND LEGS CLEAR OF REAR DOOR/RAMP WHEN CLOSING IT. FAILURE TO COMPLY MAY RESULT IN SERIOUS INJURY OR DEATH TO PERSONNEL.**

- The rear ramp/door can be operated by three methods

### Primary Method

Electronically open the rear ramp using the controls on the driver's center panel or on the hydraulic unit located in the passenger area.

CENTER  
DASH RAMP  
TOGGLE  
SWITCH



HYDRAULIC  
PUMP  
RESERVOIR  
TOGGLE  
SWITCH

### Secondary Method

The rear ramp door can be opened hydraulically using a 3-position valve

#### NOTE

A 3-position valve controls the hydraulic operation. If rear door/ramp does not operate electrically after a hydraulic operation has been performed, check to make sure 3-position valve is in the neutral position and locked. Neutral position is midway between door lower and door raise valve positions.

- To operate the door/ramp using the hydraulic pump located in the crew compartment

#### To lower the door/ramp

- Lift disc up, and pull the Knob up (door lower position).
- Insert the handle into the pump and move the handle up and down to lower the door/ramp.

#### To raise the door/ramp

- Lift disc up, and push the Knob down (door raise position).
- Insert the handle into the pump and move the handle up and down.

PUMP



KNOB

DISC



PUMP  
HANDLE

### Third Method

To manually open the rear ramp, use the controls on the hydraulic unit and the pump handle. Lower the ramp by manually operating the pump.

#### NOTE

Manual operation is used in emergency situations when no other means can open the rear door/ramp.

- To operate the door/ramp in an emergency, rotate the hydraulic cylinder manual release valve counterclockwise.



- Place the pump handle in the hole on the center bar; rotate downward and hold the center bar to unlock the ramp latch. Push rear door/ramp open. The door will open in a controlled fall damped by the hydraulic cylinder.



#### NOTE

When the emergency situation is over, rotate the hydraulic cylinder release valve clockwise to return to normal rear door/ramp operation.

### EMERGENCY ROOF HATCH

The Emergency roof hatch in the rear of the vehicle offers exit in the event of a rollover where the front driver's or passenger doors, windows or rear door/ramp, are not available. The roof hatch is opened manually by the black lever and locked with a latch.



## SECTION III – WATER ROLLOVER/EGRESS PREVENTIVE MEASURES

### WARNING

**COMBAT DOOR LOCKS ON THE MRAP FAMILY OF VEHICLES KEEP THE ENEMY OUT. WHEN LOCKED, THEY MAKE IT EXTREMELY DIFFICULT FOR RESCUERS TO ENTER THE VEHICLE. COMMANDERS SHOULD DETERMINE WHEN COMBAT LOCKS SHOULD BE USED WHEN CONDUCTING OPERATIONS NEAR BODIES OF WATER. COMBAT/ACCIDENT DAMAGE MAY ALSO JAM DOORS, MAKING THEM IMPOSSIBLE TO OPEN.**

### **WARNING**

**IF THE DOORS CANNOT BE OPENED AND THE VEHICLE IS IN WATER TOO DEEP TO ALLOW AIR IN THE VEHICLE, THE LIKELIHOOD OF DROWNING IS HIGH. IN THIS CASE, RESCUERS MUST IMMEDIATELY ROLL THE VEHICLE ON ITS SIDE USING ALL AVAILABLE MEANS (SUCH AS TOW STRAPS, ROPE, WINCH CABLES) TO GAIN ACCESS TO THE GUNNER'S CUPOLA. IDENTIFY NON-SWIMMERS AND ASSIGN THEM A BUDDY THAT IS A SWIMMER. THE BODY OF WATER MAY BE DEEP ENOUGH THAT YOU MUST SWIM TO SHORE**

### **WHEN NEAR WATER AND TACTICAL CONDITIONS PERMIT**

- Reduce speed and stop vehicle.
- Inform all personnel that you are operating around potential water hazards.
- Conduct a risk assessment of the terrain and route before proceeding.
- Maintain secure seating position by wearing seat restraints.
- Unlock combat door locks, if enemy situation permits.
- Turn on filtered dome lights.

### **FACTORS ASSOCIATED WITH FORDING OPERATIONS**

- Soldiers and leaders may not realize the buoyant force on an object is equal to the weight of the fluid displaced by that object.
- A cubic foot of water weighs about 62.4 pounds.
- Vehicles displace a lot of water when they enter a river or creek bed, and the pressure exerted by moving water increases with the square of its velocity.
- The depth and width of the area to be crossed, the bank conditions and the river's current velocity are major factors to consider before attempting a water crossing. These factors will determine if equipment and personnel can cross by fording or swimming, if use of expedient materials is practical or if specific bridging assets are required.
- Vehicles stalling or becoming stuck.
- When a vehicle stalls, personnel try to get out of the vehicle. Once outside, they are exposed to swift currents that may result in falling into the water and being swept away or jammed into debris downstream.

### **FACTORS TO CONSIDER BEFORE CONDUCTING WATER-CROSSING OPERATIONS**

- Follow all vehicle fording and swimming instructions in accordance with the vehicle's technical manual.
- During training exercises, ensure drivers and crewmembers wear personal flotation devices.
- Ensure the water depth at the fording site is below the vehicle's fording limits and the site is clear of submerged obstacles.
- Do not exceed 4 mph when entering and traveling through the water.
- Consider not wearing load-bearing equipment during fording operations. The equipment could snag on vehicle components and prevent crewmembers from escaping through the top hatches during emergencies.
- Consider leaving combat locks unlocked during fording and when operating near bodies of water.
- Store sensitive items and small arms inside the vehicle. If the vehicle sinks, these items can be easily retrieved during recovery operations.
- Attach dismounted troops to a safety line when crossing.
- Do not cross more than one vehicle at a time, and do not cross a vehicle beside dismounted troops.

## **WATER RESCUE/RECOVERY**

- Stay in contact with the vehicle, hold onto the vehicle and kick/swim to high point in buddy teams.
- First responders tie a rope/cable to the vehicle to aid in rescue.
- Open doors and hatches.
- If doors and hatches are not accessible, rescuers must immediately use all available means to turn the vehicle on its side to gain access to the gunner's hatch.
- Seek out the highest point on/in the vehicle.
- Ensure that all survivors have air and are able to breathe.
- Check for other injuries and apply first aid.
- Carefully move injured personnel to the highest point on the vehicle.
- Remove excess equipment, to include body armor in deep water.
- Evacuate from vehicle high point to safest location, depending on
  - Enemy situation
  - Water level and flow
  - Water temperature
  - Distance to water's edge
  - Anticipation of rescue