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Tools and Equipment

Use and Deployment of the Augustus Fire Tool

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East Greenbush Fire Department

Standard Operating Guidelines

ISG TALISMAN THERMAL IMAGING CAMERA USE

1. Purpose

- a. To establish a guideline to facilitate the most effective method for deploying the Thermal Imaging cameras in a way that provides the most protection for our personnel.
- b. To provide a reference document to be used for training of personnel in the uses, deployment, limitations, operation, care, and maintenance of the Thermal Image Cameras. (TIC)

2. Policy

It shall be the policy of this department to utilize Thermal Imaging cameras in every structure fire and any other situations as identified where it will enhance the safety of fire department personnel and the rescue of all potential victims.

This policy outlines the various uses of a Thermal Imaging Camera, a guideline for its use and operation in firefighting situations, method of deployment, daily inspection and care and maintenance instructions.

3. Procedure

- a. The camera is carried on 11-7. Personnel should become familiar with the location of the camera.
- b. When the engine company arrives on the scene of a fire or any other incident where smoke will or could hamper visibility, a person riding in the jump seat on the officer's side shall remove the camera from the holder and take it to the entry point of the structure. The attack crew of this apparatus will continue to be responsible for deploying the handline.
- c. If conditions warrant the use of a camera, the nozzle person shall be the operator of the camera unless an officer accompanies the crew then they will operate the camera in conjunction with the attack crew. The nozzle person should make periodic sweeps of the room and/or structure they are operating in while in the suppression mode. Through field exercises it has been determined that the safest and most efficient operation of the camera occurs when its operator's view is not obstructed by other firefighters. Search and rescue and suppression activities should occur in compliance with their respective SOG's and standard firefighting practices should continue to be observed.. Two person teams are the policy and should only be deviated in extremely dire situations

- d. Camera operators must be aware that they have a tendency to move faster than the rest of the team who are operating in zero visibility. In moderate to heavy smoke conditions the Camera allows a crew to quickly check a smoke filled area to determine whether or not there is fire present. The camera operator shall not advance too quickly, as to leave the rest of the team lost in a zero visibility environment.
- e. The Camera has the potential to inspire overconfidence because it allows firefighters to "see" in an environment that in reality has zero visibility. It is imperative that a firefighter remembers exactly that. Firefighters should remember that they must stay low even if the camera allows them to see that the majority of the heat is at the ceiling. The possibility of a flashover in the dynamic atmosphere of a structure fire is higher than ever before because of new materials, construction methods and rapid responses. Personnel must understand that the camera could fail and an escape route must be easily located, either by following a hose line or locating a window or doorway.

4. Thermal Imaging Camera Uses

- a. Provides safer navigation in a space where there is zero visibility due to smoke.
- b. Allows personnel to "see" in a zero visibility environment, which is a very useful addition to traditional search and rescue techniques. The time necessary for completing a primary search can be cut by almost half by utilizing a Thermal Imaging Camera.
- c. Enables suppression crews to execute a faster, more efficient interior attack. The shortest route to the fire, holes in the floor and obstacles in the structure can be determined and located efficiently.
- d. Reduces fatigue of interior crews because efficiency in performing searches and suppression is increased.
- e. Allows Rapid Intervention Teams to quickly and efficiently locate downed firefighters.
- f. May be used to determine fluid level within a container, which may be useful during an incident involving a hazardous material.
- g. May be used as a search tool to locate lost persons in open wilderness areas.

5. Background Information

- a.** Lack of visibility on the fireground is caused by products of combustion, primarily smoke. Smoke is composed of two elements; fire gases produced by the fuel's chemical breakdown and soot. Heavy smoke causes all the light to be scattered or blocked since the light waves cannot penetrate the particles. This zero visibility condition is what limits the effectiveness of lighting for interior firefighting operations. This lack of visibility heightens the potential for firefighters to become disoriented and lost within the fire building and in turn could hamper their ability to exit the structure in an emergency situation.
- b.** Thermal energy is not visible to the human eye, but the firefighter can feel the heat present. The Thermal Imaging Camera allows a thermal heat view of one's surroundings.
- c.** A Thermal Imaging Camera is a device that translates a thermal picture into an electrical picture and then a visual image for the human eye. This is accomplished because it relies on the thermal energy emitted by all objects and not on reflected visible light. Thermal Imagers provide vision capability with zero light present. Thermal energy is characterized by its long wavelength, and fortunately for firefighters, the nature of this long wave thermal energy allows it to travel through smoke and mist. In essence the Thermal Imaging Camera "sees" through smoke and mist.
- d.** Everything viewed through the Thermal Imaging Camera's lens retains its shape, people look like people and rooms look like rooms. The Thermal Imaging Camera provides the firefighter with a black and white television view through the smoke and darkness.
- e.** When viewing a room using the Thermal Imaging Camera, hot things appear white, hotter objects appear brighter white, and colder items appear black to gray. The whiter the representation displayed, the more heat present in the object.
- f.** The Thermal Imaging Camera allows a two dimensional view of a smoke filled environment. Depth perception is limited. Firefighters operating the camera should remain low to the ground, scanning the entire area before them. When scanning an area with the thermal imager begin at the ceiling and conclude at the floor area immediately in front of them moving the camera at a slow pace as to avoid blurring objects together. Walking with the thermal imager is discouraged as trip hazards may be overlooked.
- g.** Thermal energy does not travel directly through the walls. A thermal imager does not allow an area to be viewed, which is behind a wall. If fire is present inside a wall, the camera will only be able to "see" it if the fire has increased the temperature of the wall itself. Fire inside wooden clad walls will be picked up much faster than fire on the other side of a more significant barrier such as concrete. Normal overhaul procedures must be utilized in order to locate fire extension.
- h.** A human being will not provide sufficient thermal energy to penetrate most standard construction materials or solid items such as furniture. Therefore, it is reinforced that while conducting a search, rescuers must look under and or

around beds, sofas and other objects where victims may have hidden to escape fire.

- i. Water, plastic and glass are all effective barriers for the thermal imager and may cause a reflective image. The team operating the camera must remember that the image present on the thermal imagers' screen could be a "mirror image" of themselves or fire behind them being reflected off of glass, plastic or water. To test suspicious images, the crew should wave their arms and determine whether they are seeing their own image.
- j. Also, firefighters and occupants, who are wet from hose line operations, could be masked from the camera's view during a search because there is a momentary balance of thermal signatures.
- k. The Thermal Imaging Camera must be used with the understanding that it is only a mechanical device and it can fail. Firefighters must plan for this possibility by carrying flashlights, maintaining contact with the wall, a hose line, or other routine methods for remaining oriented to location and the position of exits in a zero visibility environment. Crews should continue to employ standard fire fighting practices.
- l. Battery life is not substantial, especially while using the visual picture overlay mode. Count on no more than twenty minutes of operation per battery, less in cold temperatures. A spare battery is also located within the camera holder on Engine 11-7. If the battery power graph is below the halfway mark upon exiting a structure, the battery must be changed prior to being handed off to another crew for use.
- m. Be aware that if the controls on the thermal imaging camera are bumped the unit could become deactivated.
- n. The image displayed by the thermal imaging camera may decrease in quality as soot builds up on the lens and screen while operating on the fire ground. A soft cotton cloth should be used to clean the lens and screen periodically while operating the camera.
- o. If the picture displayed on the screen suddenly becomes distorted, check to insure the carrying strap is not in front of the lens.
- p. "White Out" is a condition caused by aiming the unit at a very hot object or flame which causes the thermal imaging camera's sensor to become overloaded and the display to show all white, rendering the thermal imaging camera useless. To correct the problem, aim the camera away from the extreme heat source and the display should return to normal in less than one minute, often within just a few seconds.
- q. The Thermal Imaging Camera has not been determined to be intrinsically safe as an ignition source. This device is not to be used in a potentially explosive atmosphere.
- r. The camera can also serve as a tool for detecting heat during the overhaul phase of an incident. It must be remembered, however, that the thermal imager cannot penetrate most construction materials including drywall, plaster and lathe, concrete, glass or plastic. Also, the thermal imager cannot penetrate water. Due to the camera having a black and white display, it is sometimes

difficult to differentiate between what is heat or fire trapped in a wall and what is radiant heat.

6. Operation of the Camera

- a. The camera is stored in the apparatus holder on engine 11-7.
- b. In order to deploy the camera, remove it from the holder and firmly grasp the handle. The shoulder strap should be utilized in order to lessen the chance of the unit being dropped.
- c. To turn the unit on, push the red button on the bottom of the unit. It will take approximately 15 seconds for the unit to warm up; self check and become operational.
- d. Once the camera is active, an image will be visible on the screen. Cool areas appear dark while heat sources appear white.
- e. To use the Visual picture overlay press the button switch on the top of the Thermal Imaging Camera. Note use of this video mode will reduce battery life.
- f. On the bottom side of the display screen, a bar graph allows the operator to see the amount of energy reserve that remains in the units battery pack.
- g. If the battery power bar graph indicates that the battery has less than $\frac{1}{4}$ of its energy capacity remaining, it should be replaced with a fully charged battery. If the camera is deployed on an incident, the battery should always be replaced with a fully charged battery at the conclusion of the incident to insure that the camera is always in a constant state of readiness. The camera's battery is located in a compartment directly below the viewing screen. To remove the battery, flip up the locking catch lever and then slide forward and open the hinged door. Ensure that the replacement battery is reinserted with the same orientation so that the battery's contact points coincide with those of the camera. Two batteries are carried on the engine and two are in conditioners at the Main station. These are the only batteries to be used in the thermal imager.

7. Inspection

- a. The camera shall be checked as part of the routine equipment check of the apparatus to which it is assigned.
- b. The camera should be inspected for cleanliness. If any part of the camera is dirty a clean rag dampened with face piece cleaner should be used to clean the camera. Do not use window cleaner to clean the lens.

- c. The camera should be turned on and checked for proper operation and then turned off.
- d. If the battery charge indicator displays more than one bar of discharge the spare battery should be placed in the unit and the discharged battery charged with the provided charging unit.
- e. Problems with the unit should be reported to the I.C. so that they can be noted and repaired as soon as possible.

8. Maintenance

- a. Batteries should be rotated thru the conditioners in the station weekly and charged as necessary.
- b. Screws on the camera should be checked periodically for tightness.
- c. After the camera is used on an incident it should be thoroughly cleaned before it is returned to its holder and the batteries fully charged.

9. Safety

No operation as outlined in this SOG shall preclude any person from using good judgement with due regard for the safety of all personnel.

East Greenbush Fire District #3

Turnout Gear Washer Machine Instructions

***** WASH EXTERIOR AND INTERIOR LINER SEPARATELY*****

REMOVE ALL ITEMS FROM YOUR POCKETS AND ANY ITEMS HANGING FROM YOUR GEAR (ACCOUNTABILITY TAGS, POCKET SPANNERS, KNIVES, SAFETY GLASSES, AND FLASHLIGHTS ETC..) THESE ITEMS WILL DAMAGE YOUR GEAR AND THE MACHINE!!!

*****BE CERTAIN THAT ALL OF YOUR POCKETS ARE EMPTY*****

*****ZIPPER AND CLOSE ALL VELCRO COMPONENTS***

(coat flap, bunker pant pockets etc.)**

- **REMOVE ALL SPONGES AND BRUSHES FROM SINK**
- Open door by pushing down lever. Place interior liner from both your coat and bunker pants in the machine. You may also wash your hood with your interior lining.

*****REMINDER: DO NOT WASH EXTERIOR LINER WITH INTERIOR LINER***

- Close door and push lever back up until it locks in place.
- Turn machine “ON” (Far right button)
- Press, 21
- Press, Start. After pressing “START”, **DO NOT** press any other buttons or interfere with the operation of the machine.
- After about 20 seconds the machine will begin to fill with soap and water. (A-2, L-4 and D-1 will be displayed on the screen).

(If the machine does not begin filling with soap and water after about 1 minute, be sure that the door is closed all the way and that the lever is locked in place. This is a safety feature).

- After about 1 or 2 minutes from the flow of soap and water you will see a small burst of drainage from the machine into the sink.
- After the wash cycle (about 10 minutes) is complete, the machine will automatically drain into the sink and begin the first of three rinse cycles. (D-3, A-1 and L-5 will be displayed on the screen).
- Each cycle will last approximately 5 minutes. The machine will automatically complete the three rinse cycles. You will not have to do anything to the machine.
- Machine will start to extract water from the gear in the spin cycle.

- After 8 minutes machine goes to a very slow spin and counts down. The machine will count down on two different time settings.
- After 3 beeps, the machine has completed its operation and you can remove your gear.
- Total time of operation is about 40 minutes.
- After this cycle is complete, you can now wash your exterior gear and gloves and begin the same operation as before.
- Hang your gear separately to air dry.

****DO NOT DRY YOUR GEAR IN A DRYER OR IN DIRECT SUNLIGHT**

- Once you have completed, do not forget to **TURN OFF MACHINE**

If you have a problem with the machine, be sure the door is closed all the way and that the lever clicks/locks into place. This is a safety feature and the machine will not operate unless the door and lever are closed properly. If you are still having difficulties and this does not clear the problem, contact your station chief.