Egg Harbor Fire Department and First Responders
Standard Operating Guidelines

SUBJECT: THERMAL IMAGING CAMERA USE **SOG 319**

PURPOSE:

A. To establish a guideline to facilitate the most effective method for deploying the Drager Thermal Imaging Camera 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 Imaging Camera**.**

SCOPE: This policy shall apply to all members of the Egg Harbor Fire Department.

AUTHORITY AND RESPONSIBILITY

It shall be the policy of this department to utilize thermal image 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.

PROCEDURE

A. The cameras are carried on Engine 6 and Ladder 21. Personnel shall become familiar with the location of the cameras. Ultimately, an officer shall determine who will operate the camera. Ideally it will be assigned to the first crew operating on the incident.

B. If conditions warrant the use of the camera, the interior officer, or designee, shall operate the camera in conjunction with the attack crew. The operator should make periodic sweeps of the room and/or structure that they are operating in, while in the suppression mode. Command should be notified that the camera is in use. Search and rescue and suppression activities should occur in compliance with their respective SOG's and standard firefighting practices should continue to be observed.

C. 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. The camera operator shall not advance too quickly, as to leave the rest of the team lost in a zero visibility environment.

D. 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

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following a hose line or locating a window or doorway. The thermal imager 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.**

OPERATING THE THERMAL IMAGING CAMERA

A. Turning on the thermal imaging camera.

1. Wait approximately 15 seconds after removing camera from charger before turning the camera on.
2. Briefly press the ON/OFF button (large button in center of panel with LED in the center of it). A start-up screen will appear for approximately 5-8 seconds and the LED in the ON/OFF button will light until an IR image appears on the screen. Then the LED will turn off.
3. Battery charge status is shown by a small battery indicator in the lower center of the screen. It is a 5 segment indicator with all being dark the battery is at full charge and no segment dark being empty. When indicator is flashing battery is extremely low. No segment dark "SHUTDOWN" is indicated on the screen, the camera will shut down after approximately 10 seconds.

B. Turning off the thermal imaging camera.

1. Press the ON/OFF button for more than 5 seconds. The thermal imaging camera will indicate the message "Hold to power down, release for standby".

C. Activating the Standby mode.

Using the standby mode will save battery life.

1. To enter standby mode, press the ON/OFF button for 1 to 5 seconds. The thermo imaging camera will indicate the message "Hold to power down, release for standby". Once you have released the button, the LED in the ON/OFF button will start flashing. The display will switch off.
2. To return to normal camera operation, briefly press the ON/OFF button. The thermal image will be immediately displayed on the screen. The LED on the ON/OFF button will turn off indicating that standby mode is deactivated.

D. Activating the zoom function.

The zoom function is 2X.

1. To turn on the digital zoom, press the MODE button (small blue button to the right of the ON/OFF button) for less than 1.5 seconds. A magnifying glass will be indicated on the screen.
2. To turn off the digital zoom, press the MODE button (small blue button to the right of the ON/OFF button) for less than 1.5 seconds. The picture will no longer be enlarged and the magnifying glass will disappear from the screen.

E. Temperature display

1. The camera measures the temperature of the small area in the center of the reticle. The measured temperature is shown as a digital readout in degrees F.

The temperature display will include a "+" if the maximum temperature has been reached.

2. The camera always shows the average temperature of the area where the temperature is measured. The area where the temperature is measured depends on the distance to the objects being measured. The area gets bigger as the distance from the measured object increases. Temperatures can be measured more precisely if the distance to the object is short.
3. The camera recalibrates periodically. The temperature drift from shutter calibration to the next one is approximately 10%.

F. Operating modes.

The thermal imaging camera has 2 operating modes, normal mode and firefighting mode. The camera automatically selects the appropriate operating mode depending on the temperature of the objects you are looking at. Normal mode is used for scenes with object temperatures up to approximately 266 degrees F. The thermo imaging camera switches to firefighting mode when the temperature of more than approximately 10% of the objects in the scene is higher than approximately 266 degrees F.

1. Normal Mode

   In **normal mode**, you can select between several color palettes. The color palette indicator (symbol in lower left of screen) shows which color palette is currently activated. The default color palette is "TempColor" (shown as CP 01 on the display).When this color palette is selected, all objects above approximately 230 degrees F is displayed in yellow, orange and red, with red corresponding to the highest temperature. All object below approximately 230 degrees F are shown in grayscale where black corresponds to cold objects, whereas white corresponds to hot objects. All objects below approximately 32 degrees F are shown in blue.

2. Firefighting Mode

   In **firefighting mode**, the dynamic range of the thermal imaging camera is set to maximum. The scene will always be displayed using the "TempColor" palette. The color scale stretches from grayscale (black to white) via yellow and orange up to red, with red corresponding to the highest temperature. All objects above approximately 572 degrees F are shown in yellow. When the temperature of the indicated scene is below approximately 266 degrees F the camera will switch back to normal mode.

G. Activating the color palettes in normal mode.

When the thermal imaging camera is switched on and neither the firefighting mode nor the Thermal Scan feature is activated, you can toggle between the different color palettes.

1. Press the Mode button (small blue button to the right of the ON/OFF button) for more than 1.5 seconds. The thermal imaging camera selects the next color palette.

2. Each time you press the Mode button (small blue button to the right of the ON/OFF button) for more than 1.5 seconds, the thermal imaging camera selects the next color palette.
3. When the thermal imaging camera switches to the firefighting mode, the standard color palette "TempColor" is used regardless of the selected color palette.
4. When the camera returns to normal mode again, the previously selected color palette will be shown again.

H. Thermal Scan feature

1. Activating the Thermal Scan feature.
   Press either the DOWN or the UP button (the 2 small blue buttons on the right side of the ON/OFF button) for approximately 1 second."TS ≥ 140 degrees F" is indicated on the screen. This is the default value.
2. Changing the Thermal Scan threshold.
   To raise the ThermalScan threshold, press the UP button. The respective threshold is indicated on the screen.
3. To lower the Thermal Scan threshold, press the DOWN button. The respective threshold is indicated on the screen. If you hold down the Down or Up button, the threshold will change more quickly.
4. Deactivating the Thermal Scan feature.
   Simultaneously press both the UP and the Down buttons and hold for approximately 1 second.

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 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.

BACKGROUND INFORMATION

A. The Thermal Imaging Camera allows a two dimensional view of a smoke filled environment, Although 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.

B. 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.

C. 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.

D. 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. 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.

E. 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 hoseline, 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 firefighting practices.

F. Battery life is not substantial (approximately 4 hours). A spare battery is also located within the camera holder on the apparatus. If the battery power graph is below the halfway mark upon existing a structure, the battery must be changed prior to being handed off to another crew for use.

G. Be aware that if the controls on the thermal imaging camera are bumped the unit could become deactivated or settings could be changed.

H. 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.

I. 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.

J. 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.

MAINTENANCE

A. **After each use**

Inspect the TIC for structural, heat, and/or chemical damage to the case or lens. Carefully examine all mechanical hardware to ensure no screws are loose or missing. Clean all external surfaces by wiping with a solution of mild detergent and warm water. Dry with a soft, lint-free cloth to avoid scratching the optical surfaces. Make sure to recharge the battery after each use and or change the batteries when indicated by the low battery warning signal. **CAUTION:** Do not use solvents or paint thinners to clean the TIC, as they could permanently mar the surface or degrade the protective properties of the casing.

B. **Monthly**

Inspect the TIC for structural, heat, and/or chemical damage to the case or lens. Carefully examine all mechanical hardware to ensure no screws are loose or missing. Ensure that the batteries are charged and switch the battery in the camera with the spare battery. Turn the TIC on and run it through all of the different pallets. If there are any problems with the camera that cannot be repaired during inspection, red tag it and remove it from service following **SOG 316.**

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.

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