JEFFERSON COUNTY FIRE DISTRICT #1
STANDARD OPERATING GUIDELINES

SOG 507

THERMAL IMAGING CAMERA USE

I. PURPOSE
   A. To establish a guideline to facilitate the most effective method for deploying the Bullard 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.

II. SCOPE
   A. These standards apply to all personnel of the District.

III. AUTHORITY AND RESPONSIBILITY
   A. 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.

IV. STANDARDS
   A. Procedure
      1. The camera is carried on the first-out structure engine. Personnel should become familiar with the location of the camera. Ultimately, a company officer shall determine who will operate the thermal imager. Ideally it will be assigned to the first crew operating on the incident.
      2. When the engine company arrives on the scene of a fire or any other incident where smoke is or could hamper visibility, the person riding in the officer position, or designee, shall remove the camera from the charger 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.
      3. 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.

4. 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.

5. 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. 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.

6. If the camera is not to be used for a period of time but needs to remain in a state of readiness, enter it into “sleep” mode. When the camera is in the “sleep” mode, the screen will be blank, however, the battery power bar graph will remain active and a “sleep” symbol will appear on the screen. To activate the camera from the “sleep” mode, depress the RED button.

B. Thermal Imaging Camera Uses

1. Provides safer navigation in a space where there is zero visibility due to smoke.

2. 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.

3. 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.

4. Reduces fatigue of interior crews because efficiency in performing searches and suppression is increased.

5. Allows Rapid Intervention Teams to quickly and efficiently locate downed firefighters.

6. May be used to determine fluid level within a container, which may be useful during an incident involving a hazardous material.

7. May be used as a search tool to locate lost persons in open wilderness areas.

C. Background Information

1. 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.

2. 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.

3. 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.

4. 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.

5. 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.

6. 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 employee standard firefighting practices.

7. Battery life is not substantial. A spare battery is also located within the camera holder on the engine. 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.

8. Be aware that if the controls on the thermal imaging camera are bumped the unit could become deactivated.

9. 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.
10. “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. The camera also has a thermal throttle on the front of the camera to preserve the quality of the image produced. The throttle is a manual adjustment mechanism that will enable fine-tuning of the screen image for improved picture contrast in extreme temperature variations.

11. 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.

12. 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.

D. Safety

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

APPROVED: DATE 12-01-2005

Earl Cordes
Fire Chief