

# Thermal Imaging: Heat and Light

**P**hotographic cameras use reflected light energy to create an image. Infrared cameras like the Navigator II use radiated thermal energy—heat—to generate an image. The electromagnetic spectrum made up of everything from gamma rays to radio waves contains both the very small visible light spectrum we see with our eyes as well as the infrared spectrum used to detect differences in heat signature by the Navigator II camera sensor.

The only difference between most of these forms of energy is in the wavelength. Infrared energy has a slightly longer wavelength than the energy of the visible light spectrum. An infrared imaging camera sees differences in the heat energy from the objects in its field of view. If everything in the frame were exactly the same temperature, no contrast would exist, so no image would be produced.

Two types of things are seen by thermal-imaging cameras: objects that reflect heat and those that generate their own heat. Heat energy transferred to objects by the sun during daylight hours will stay with the object for some time. So views of certain reflecting objects—channel markers, floating debris, docks, or shoreline vegetation—will vary as they cool off after dark. Heat-generating objects like people, engines, or electrical equipment will always present a noticeable heat signature and will show up well on a thermal-imaging camera system.

Contrary to what some might say or think after viewing a thermal image, these cameras cannot see through things. What the viewer is actually seeing when it appears they can see through the hull of a vessel to the structural members or the glow from the powerplant is the increased surface temperature of the hull near these objects.