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13. ABSTRACT *(Maximum 200 words)*

The purpose of this grant was to purchase equipment to enable us to study the influence of people's beliefs about thermodynamics and the influence of those beliefs on their ability to interpret infra-red images. For this project, we purchased an Inframetrics Thermacam PM250 to collect thermal images (at a cost of $51,517). In addition, we purchased a compaq deskpro personal computer for processitn the images (at a cost of $7,373). The computer was used to run a variety of image processing programs including Thermonitor, a proprietary program sold by Inframetrics (for $6,515). The Thermacam stores both video and still picture output. To store the video images, we purchased a Sony video walkman (for $1,250). To store the still images, we purchased a PCMCIA card with the Thermacam, and a card reader for the computer (at an approximate cost of $400). In order to get visible light images of the scenes for which we get infra-red images, we purchased a Kodak DS-120 digital camera (at a cost of $999). In addition, we purchased an Epson color scanner (at a cost of $1,400). Finally, purchased an Epson color ink-jet printer, and a Hewlett Packard laser printer for printing images.

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Air Force Office of Scientific Research
Project Number F49620-97-1-0155
Human Cognitive Performance in the Interpretation of False-Color Non-literal Imagery
Project Director: Arthur B. Markman

Final Report

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At this time, all equipment has been received, and the system is now operational. Because of hardware and operating system problems with the computer, the system was not functioning properly until December. Since then, we have begun as series of studies looking at what people know about heat and heat flow, and how they interpret thermal images.

At Columbia, in collaboration with graduate student Julia Kalmanson, we have gathered a set of 32 images and asked people with no prior experience with infra-red images to sort those images into groups under different instruction conditions. First, they are asked to sort them in any way they choose. Then, they sort them based on similarities in their appearance. Next, they sort them based on their thermal properties. This task will provide a baseline for subsequent studies in which people are taught more about thermodynamics in the course of learning about infra-red images.

At Adelphi University, Dr. Robert Hoffman, the co-principal investigator on this project, has been developing additional diagnostic tasks for assessing people's beliefs about heat flow. In addition, he has been testing experts in thermodynamics on process-tracing tasks to understand how they search for information in thermal images. In these studies, the picture is initially covered by a grid. In order to see more information, the participant has to request that a square of the grid be uncovered. In addition, the participant talks aloud while interpreting the image. By looking at what the participant says, as well as the order in which they uncover aspects of the image, we can gain insight into how expert thermographers interpret images.