Reprinted from

Symposium on

Machine Processing of

Remotely Sensed Data

June 27 - 29, 1979

The Laboratory for Applications of
Remote Sensing

Purdue University
West Lafayette
Indiana 47907 USA

IEEE Catalog No.
79CH1430-8 MPRSD

IMAGE REPRESENTATION OF DIGITAL REMOTE SENSING DATA: A PERSPECTIVE

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Remote sensing data is the main component for determining answers to numerous fundamental questions regarding the earth's environment and resources. Throughout the history of man, he has answered many of these questions with his own human remote sensors. Primary to these sensors are the images obtained by his eyes and interpreted by his brain. Universally, humans guide much of their activity based on images obtained by their eyes. Today, satellites with multispectral scanners take synoptic views of the earth's surface. While computers aid modern interpretation of these reconstructed digital images, humans still obtain much meaningful interpretation by visual inspection combined with numerical analysis to produce useful information.

The use of images to portray the results obtained from remote sensing information is natural to human interpretation. All too often, however, images are used without proper background for proper usage. In fact some results are merely passed over as modern computer art rather than sound scientific results obtained from rigourous analysis of remotely sensed data. This paper will define parameters of image display which provide effective guidance for proper presentation and use of images of remotely sensed data.

Image representation of remotely sensed data may occur in several forms during the analysis process. One form of images may be the reconstructed image. This image represents the original data. An enhanced image in contrast represents data which may have had either or both radiometric or geometric preprocessing applied. Finally, there is the classification image which represents the themes of information obtained via analysis of the remotely sensed data. This last form is one of the most commonly misunderstood images.

The key to proper understanding of results oriented images may be aided by asking the following key questions. Who will use the images? How and where will the images be used? What should the viewer of the image learn from the image? This last question only helps to focus on the fact that there are parameters for data display.

The first parameter is when to use an image and in what form. Images are used before, during and after analysis. As noted earlier, the respective form of image tends to be reconstructed, enhanced and classification image. Second, geographic considerations must be taken into account. Such geographic considerations include the size of the area to be represented, the application of spatial corrections and the use locations indicators. Third, the amount of detail to be shown may be determined on two levels. The first level of detail is in the form of spatial resolution while the second is image display information level more commonly referred to as classification to level I, II or III.

A fourth parameter is image display format: black and white versus color. The number of gray levels or colors respectively used may directly affect the amount of information transfer possible with a given image. Scale of the image affects the land area which may be depicted within a given physical size of image. Physical size may be 35 mm or topo map size. Finally, the medium of display may be softcopy and temporary as a digital display CRT, or hardcopy as paper and film products.

While these outputs may be produced by different methods and equipment, the overriding tempering factor to all the parameters is likely to be cost. Cost of image output must be in perspective however, as images represent the ultimate and likely cost effective information transfer vehicle for results obtained from analysis of remotely sensed data.

CH1430-8/79/0000-0360$00.75