characteristics of data stored at EDC can be determined by requesting a geographic computer search using latitude and longitude of the area of interest.

A new all-digital system for handling and processing LANDSAT data is in operation at EDC. The data are radiometrically corrected for detector gain and offset and geometrically corrected to a Space Oblique Mercator (SOM) map projection, using cubic convolution resampling techniques. Upon request, the user can obtain data which are corrected to the Universal Transverse Mercator (UTM) or Polar Stereographic (above 65° lat.) map projections with the nearest neighbor resampling technique. The user may also request geometrically uncorrected high-density digital tapes. When placing an order for LANDSAT image products, the user may select or omit contrast and edge enhancements. Film and digital tape products from the LANDSAT multispectral scanner system (MSS) and return beam vidicon (RBV) camera are available in a variety of formats and scales.

LANDSAT data over areas outside the United States are available at EDC; these data are acquired by receiving stations in Canada, Brazil, Italy, and Iran and are also available from these countries. Scale, format, and prices of LANDSAT products from foreign receiving stations are similar to those distributed by EDC.

Other federal and state agencies duplicate aerial photographs for users on request. Scale, area coverage, and film type vary. The most common aerial photography is panchromatic at a scale of about 1:20,000 and in a 9 × 9-in. format. Some color and color infrared photographs also may be available.

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Characteristics of Remotely Sensed Data Acquired from Aircraft

Remote sensing technology has advanced rapidly during the past 2 decades, to the point where sensor systems are capable of acquiring data in wavelength bands from the ultraviolet through the visible and infrared to the microwave. Imaging sensor systems used in aircraft can be grouped into three general catagories: camera, optical-mechanical scanner, and sidelooking radar.

The aerial camera records radiation reflected from features on the earth's surface on black-and-white, normal color, and false-color infrared films. Black-and-white films are used frequently for mapping purposes; however, usage of color films is increasing. Normal color films have advantages in ease of interpretation because surface features are displayed in colors similar to those observed by the human eye. However, atmospheric scattering of incident solar radiation can have a significant deleterious effect upon the processed color photograph. False-color infrared films record reflected radiation in the near-infrared, red and green portions of the electromagnetic spectrum. The false-color photograph displays healthy vegetation as red, water as dark blue to black and red rocks or soil as a hue of yellow. Advantages of false-color infrared photography include less sensitivity to atmospheric scatter; greater contrast between vegetated and nonvegetated areas, moist and dry soils, clear and turbid water, and fresh and old snow; and, in some situations, an enhanced depiction of variations in vegetation owing to stress or species differences.

Optical-mechanical scanners employ photo-electric sensors to record radiation reflected from the earth's surface. The instantaneous-field-of-view (IFOV), normally expressed in milli-stereradians, and the altitude of the aircraft determine the ground resolution (size of the area on the ground that is sampled at any instant of time). Multispectral scanners record reflected and emitted energy in a number of wavelength intervals within the ultraviolet, visible (0.4 to 0.7μm) and infrared (0.7 to 14μm) portions of the electromagnetic spectrum. The infrared (IR) region generally is subdivided into two parts: the reflected IR (0.7 to 3.0μm) and the thermal IR (3.0 to 14.0μm). Thermal IR scanners record emitted radiation in two atmospheric windows (generally 3 to 5μm and 8 to 14μm). The apparent temperature of earth materials is a function of their emissivity and their absolute temperature. Conventional thermal infrared images display variations in apparent surface radiant temperatures in shades of gray with light tones representing warm temperatures and dark tones representing cool temperatures.

Side-looking airborne radar (SLAR) is an active imaging system because if transmits electromagnetic energy that illuminates the terrain. Radar systems operate in the 0.8 cm to 1 m wavelength range of the spectrum. They can be used during day or night and under most weather conditions. Direction and angle of illumination can be controlled to enhance topographic expression of geologic features. The interaction between terrain materials and the transmitted pulse of electromagnetic energy is complex and depends on orientation, surface roughness, and electrical properties of terrain features. Conventional SLAR images display the intensity of the energy returned to the radar received in tones of gray: light tones represent high intensity returns (such as buildings and slopes facing the antenna) and dark tones indicate low intensity returns (such as smooth water, dry lake beds, and roads). Radar has several advantages for regional analysis of geologic structure and terrain analysis: control of illumination direction, day and night and all-weather capability, suppression of surface detail, and continuous image strips.

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Origin and Characteristics of Pennsylvanian-Age Multistory Fluvial Sandstones of Illinois Basin

Continuing studies of Illinois basin Pennsylvanian stratigraphy have revealed a fluvial sandstone body of Desmoinesian age in the central and southern part of the Illinois basin. The sand body is a series of multistory or "stacked" sandstones that aggregate more than 300 ft (100 m) thick, as much as 2 mi (3.2 km) wide, and more than 100 mi (160 km) long, making part of a series of interrelated sandstones that constitute the Highland fluvial complex. The sand complex includes as many as