

to daytime and good weather operations; however, they collect image data in very different ways.

For both of these systems, reflected radiation from the sun is focused onto one or more electronic detectors that convert the light intensity of the scene to proportional electronic voltages, which are then stored onto magnetic tape, rather than film. The electronic detectors within any particular system vary in number. Multi-spectral systems, as the name suggest, use several detectors focused simultaneously on several narrow spectral bands, ranging from ultraviolet wavelengths to the visible and thermal segments of the spectrum. Each channel or discrete band can be analyzed individually or simultaneously through the use of electronic digital imaging processing equipment. The major advantage of the use of multi-spectral sensors over aerial photography or simple electro-optical sensors, is the depth of manipulation of the received spectral channels. Since all objects reflect different proportions of the spectrum, image processing techniques can exploit specific spectral bands characteristic of certain objects on the ground. For example, if a camouflaged weapon is hidden within a vegetated area, the differentiation between the spectral signature of the vegetation and the camouflage can be readily distinguished.

The swath width of these systems is usually somewhat less than that of aerial camera systems, especially the panoramic type. Although the field-of-view is reduced, the amount of information is considerably larger, since several bands or channels of information are collected for each scene. This results in a need for substantial data storage and data processing capabilities. Data reduction, or image processing of multi-spectral and electro-optical imagery is far more complex and time consuming than the production of an aerial photograph. This is a disadvantage when timely information is required.