

Airborne Remote Sensing



AG-RECON (Agriculture Aerial Reconnaissance), Kirkland, Washington exemplifies a small but growing number of companies providing commercial remote sensing services employing digital imaging, image analysis and image enhancement techniques pioneered by NASA.

AG-RECON is headed by David Olson, who holds an engineering degree



from California Polytechnic State University. **At left**, Olson (left) is shown with pilot Curtis Holmes identifying ground landmarks prior to a data acquisition flight in AG-RECON's

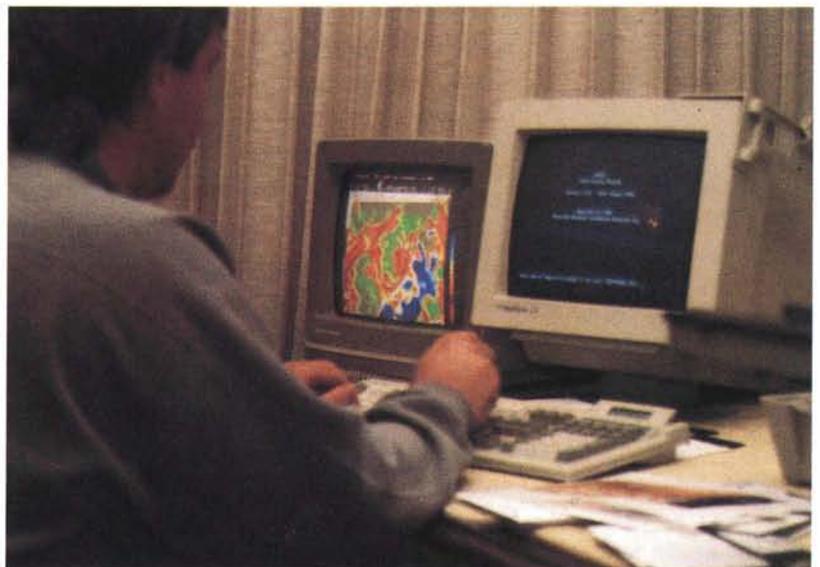
Riley Turbo-Stream aircraft. Olson is pictured **at right** processing data from a flight and at **upper right** comparing actual ground conditions of a field with data acquired by airborne imaging.

AG-RECON provides information from airborne sensors and aerial photography, satellites and ground databases on agriculture, forestry and

the environment. The information is used by farmers, foresters, geologists, hydrologists, cartographers, consultants and other decision makers.

The company's aerial reconnaissance system monitors reflectances from the ground in visible, infrared and ultraviolet light bands of the spectrum. Computer processing of the discrete frequencies of light reflected from the ground reveals the presence — or absence — of a particular condition that may warrant investigation or special treatment, for example, crop disease and pest infestation.

Other types of agricultural management information collected by AG-RECON overflights include detection of nutrient deficiencies, soil type changes, irrigation scheduling and distribution problems, frost damage and yield projections. In forest management, AG-RECON information delineates forest fire areas, monitors selective timber cutting and estimates stand survival. Information for environmental management includes extent of range or forest fire damage, oil spill





NASA IMAGING TECHNOLOGY PROVIDES A BASIS FOR A COMMERCIAL AGRICULTURAL RECONNAISSANCE SERVICE

boundaries, spray damage and thermal plumes, among a wide variety of other applications.

AG-RECON's basic product is a computer-generated color "map" of Earth conditions. These maps, accurate to scale and containing indications of absolute and relative differences, are delivered within hours of the time the conditions were actually observed.

There are a number of different types of specialty maps, for example, COLORMAP, in which natural colors are enhanced so that problems represented by changes in crop color can be detected earlier, or GROWTHMAP, in which different colors identify stands of trees and their densities for forest inventory.

Another example, shown **below**, is STRESSMAP, a forest analysis product

in which each shade of color represents a one degree Fahrenheit change of temperature, with red the warmest areas and blue the coolest. Temperature changes can indicate changes in species, drainage problems, fire damage, and water disease and pest stress. If canopy temperature in an area is proportionately warmer to its canopy density, compared with similar areas within an image, there may be a disease or pest problem that calls for on-site investigation. With products like STRESSMAP, forest professionals can increase the speed and accuracy of their surveys and improve work documentation and tract histories. Other types of STRESSMAPs define temperatures for agricultural crops; any field condition that affects plant stress will show up as a change in one of 20 color categories. ●

