

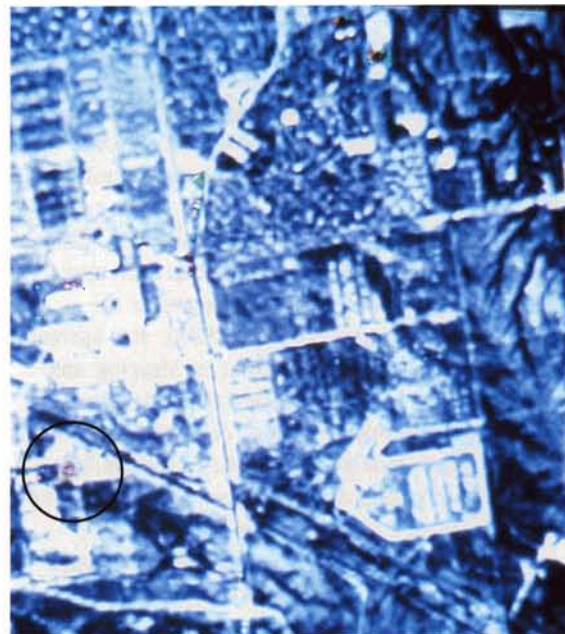
Waste Site Mapping

Environment and Resources Management

At Davis Monthan Air Force Base, Tucson, Arizona, the Department of Defense maintains a storage facility for thousands of old aircraft that might be restored to service condition in an emergency. Since the 1950s, aircraft considered not restorable have been melted down in on-site furnaces to reclaim the aluminum in their airframes. The process produces aluminum ingots and leaves a gray, ash-like residue known as "dross" which, for decades, was simply dumped in the desert. A dross site and the furnace that produced it is shown **below**.

Dross contains heavy metals such as lead, silver, cadmium and copper. These metals are contaminants and the Pima County Department of Environmental Quality wanted a cost-effective method of locating dross dumps.

Although it had not previously been done, Dr. Larry Lepley of Lepley & Associates, consulting geophysicists in Tucson, and Sandra L. Perry of Perry Remote Sensing, Ltd., Denver, Colorado, felt that the NASA-developed Landsat Thematic Mapper (TM) could be used to screen the area for dross.



The two contracted to study the TM potential in this type of application. The challenge was the fact that the known dross dumps were typically no larger than 50 meters across, so small in satellite imaging terms that dilution of the dross spectral signature from desert background was inevitable.

Perry succeeded in developing a special two-step procedure in which dross and background were separated by classification of the principal components. Paper color copies of the classified dross target images were scale-matched to a published Tucson area map, and Lepley field-checked the targets. His field evaluation found the mapping accurate where dross dumps were 50 by 50 meters or larger. The Perry/Lepley report concluded that "given sufficient spectral contrast with the background, contaminated soil areas of only a few pixels in area can be mapped with TM data," opening the door for similar applications. **Above** is a TM image of the Tucson area showing a dross dump as a tiny red dot (circled).