

## Broadening the Earthscan Industry

Among environment-related technology transfers is a NASA/private sector partnership effort to expand commercial remote sensing

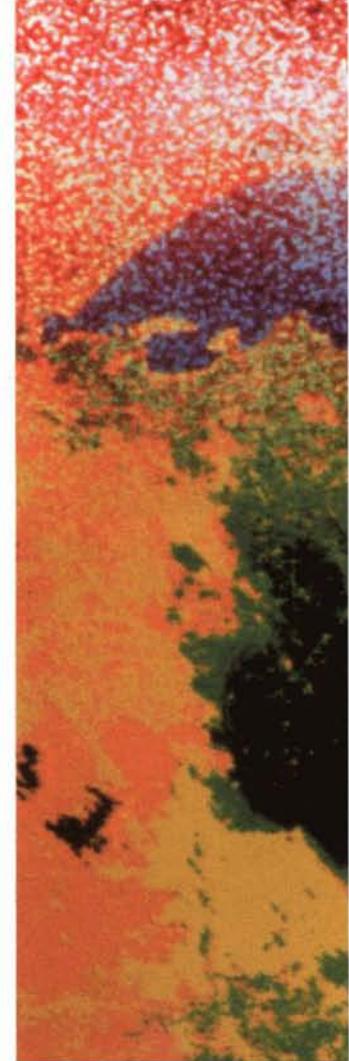
Remote sensing is the process of acquiring physical information from a distance, for example, obtaining data on Earth features from sensors aboard satellites or aircraft. These sensors detect various types of radiations emitted by or reflected from objects on Earth and, because each object has its own special "signature," the data can be interpreted to tell the difference between one kind of vegetation and another for example, or between clear and polluted water, or between densely populated urban areas and lightly populated farmland.

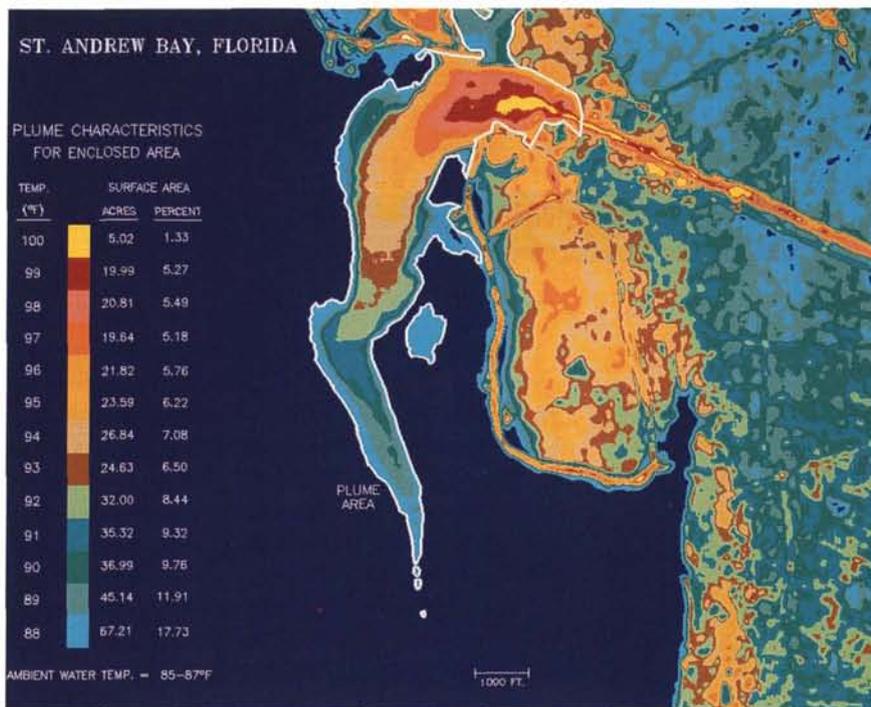
This type of information is being put to practical use in agricultural crop forecasting, land-use management, water quality evaluation, mineral and petroleum exploration, rangeland and forest management, and scores of other applications. Users of remotely sensed data are supported by a small but growing industry that provides computer processing, data analysis and interpretation services.

NASA seeks to accelerate the growth of this "Earthscan" industry because expansion of commercial remote sensing offers broad economic potential for the nation. Among a number of mechanisms designed to promote remote sensing is the Visiting Investigator Program (VIP) managed by Stennis Space Center.

VIP is directed toward small companies who might be able to use remote sensing profitably in their businesses but who do not have much money to invest in exploring new technologies. VIP costs them nothing but their own employees' travel expenses. A prospective VIP participant submits a proposal involving use of remote sensing in an actual project. If the proposal is accepted, Stennis Space Center acquires the remote sensing data, provides instruction in the use of remote sensing software and hardware, and guidance in executing the project. It's a low risk opportunity for companies to develop new capabilities they can market.

An example of a VIP project is the work of Law Environmental, Inc., Kennesaw, Georgia, a professional engineering and Earth sciences consulting firm. Law proposed a VIP project in which remote sensing would be applied to one phase of a broad environmental assessment the company was undertaking for a client. The client operates an electricity generating plant near Panama City, Florida that draws in cooling saltwater from one point in adjacent St. Andrews Bay and releases a heated water discharge into another part of the bay. Law's study was intended to evaluate the effects of the heated discharge on local aquatic life. Stennis Space Center provided the remote sensing data that enabled Law to produce images of the thermal "plume," the water area affected by the heated discharge. The plume's shape, the area it covered and the distribution of surface temperatures were determined under the "worst case" conditions of summer, low water level (low tide) and high water level (high tide). After the plume information was gathered, Law studied selected plant and animal life in





*This image shows the actual temperatures of heated water being discharged into a Florida bay from a generating plant. It was part of a broader study of the power plant's impact on plant and animal life in the bay, conducted in a NASA program to help private firms capitalize on the potential of commercial remote sensing.*

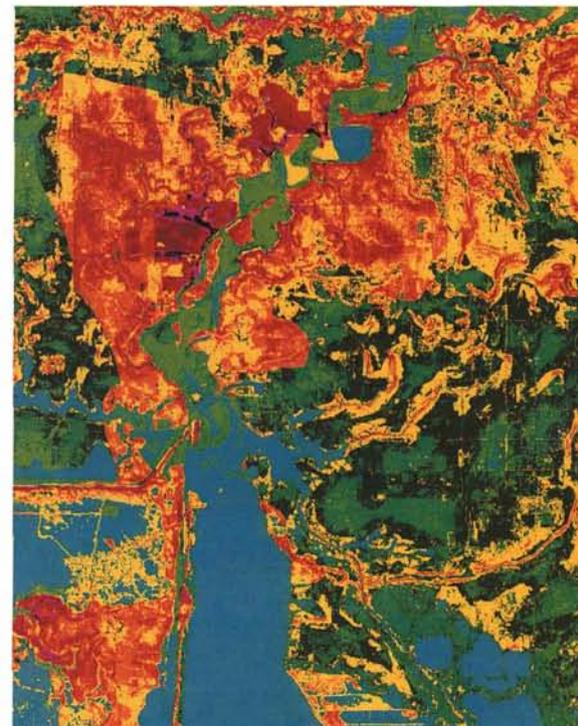
the discharge area for comparison with similar life in an unaffected control area. Law was able to conclude that the plant and animal life were not substantially affected by the generating plant's heated discharge.

VIP gave Law Environmental hands-on experience in a technology new to company employees and increased Law's competitiveness by adding remote sensing to the company's conventional ecological assessment techniques. Law has since conducted a number of commercial remote sensing projects.

A similar beneficial result was reported by Subra Company, Inc., New Iberia, Louisiana, a company that offers commercial environmental studies and analytical services. Under the VIP program, Subra teamed with Stennis to develop software models for tracking the impact of nonpoint source (NPS) pollution. Point source pollution is typically discharge from industrial facilities through pipes or conduits; NPS pollution is transported by water movement over land, the "runoff" that picks up pollutants and carries them into rivers, lakes, wetlands and ground water. Cities with populations above 100,000 are now required to identify NPS and take steps to control it, but tracking NPS by conventional means is a labor intensive job involving a lot of field study.

With Stennis' help, Subra analyzed a test area in Calcasieu River Basin, Louisiana, using satellite data to produce a land cover classification of the whole area as a first step. Subra added data on soil permeability, elevation, slope, hydrography, drainage basins and NPS locations to make a complete remote sensing/geographic information system that can be used by government agencies for planning pollution control actions. In VIP, Subra learned how to use remotely sensed data to compress the time required for a difficult task and thus expanded its range of expertise; the company is now offering technical services based on remote sensing to industrial clients.

By April 1994, 24 companies had participated in Stennis Space Center's VIP; as a result of their VIP experiences, 13 companies had developed new products or services.



*A composite image rates the impact of non-point pollution sources, such as rain runoff, on an area of Calcasieu River Basin, Louisiana (shades of green/blue are low impact areas, yellow/red high impact areas). The study project gave a Louisiana company valuable hands-on experience in applying remotely sensed data.*