Aerial thermography — important in energy conservation

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The mysteries of infrared radiation were first revealed in the early 1800s, after discovery by Sir William Herschel, an English astronomer. Looking for a way of shading his eyes, he undertook an extensive study of solar radiation. In his experiments, he placed thermometers at different places in the spectrum after the sun's rays had been passed through a prism, and found the highest temperatures were just beyond the red end of the visible light. The public was fascinated by the existence of radiant energy invisible to the naked eye.

Until about 1960, only the military applied infrared remote sensing. In the Vietnam war the U.S. used aerial thermography to show up enemy positions, for instance. Then it was applied to environmental problems, and only in the last couple of years have thermograms been used to detect heat loss from buildings.

Now, aerial thermography can produce rapid, inexpensive heat-loss surveys of large industrial and residential areas, and detailed computer or visual analysis of the aerial data can identify areas needing further investigation.

Between January 1974 and April 1977, the Canada Centre for Remote Sensing (CCRS), Department of Energy, Mines and Resources, has made aerial thermograms for 18 Canadian groups representing government departments, universities and private industries....

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Aerial thermography is particularly useful for assessing heat losses from flat-roof buildings. Relative amounts of heat loss can be determined by visual interpretation for this type of structure. For example, the accompanying aerial thermogram of several office buildings reveals light areas that correspond to warm surfaces. It can be readily seen that roofs A and B are distinctly warmer than roof C.

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D was found to coincide with an interior corridor which carries a warm-air duct above a false ceiling close to the structural concrete. Heat loss from an underground heated garage marked E is the most striking feature on the entire thermogram, vividly illustrating the poor insulating properties of concrete.

Houses harder to analyze

Interpretation of thermograms of residential houses is less straightforward, complicated by effects of attic ventilation and roof pitch. Heat is normally conducted through a flat roof directly from the building interior to the exterior surface, but the attic of a residential house acts as a buffer between the roof surface and the house interior. Also, attic ventilation dissipates some of the interior heat losses, reducing the amount of heat which can be dissipated by radiation. This reduces thermal contrasts between well and poorly insulated houses. Variations in roof pitch affect ventilation through changes in attic volume and configuration and also directly influence the infrared energy received by the infrared line scanner.

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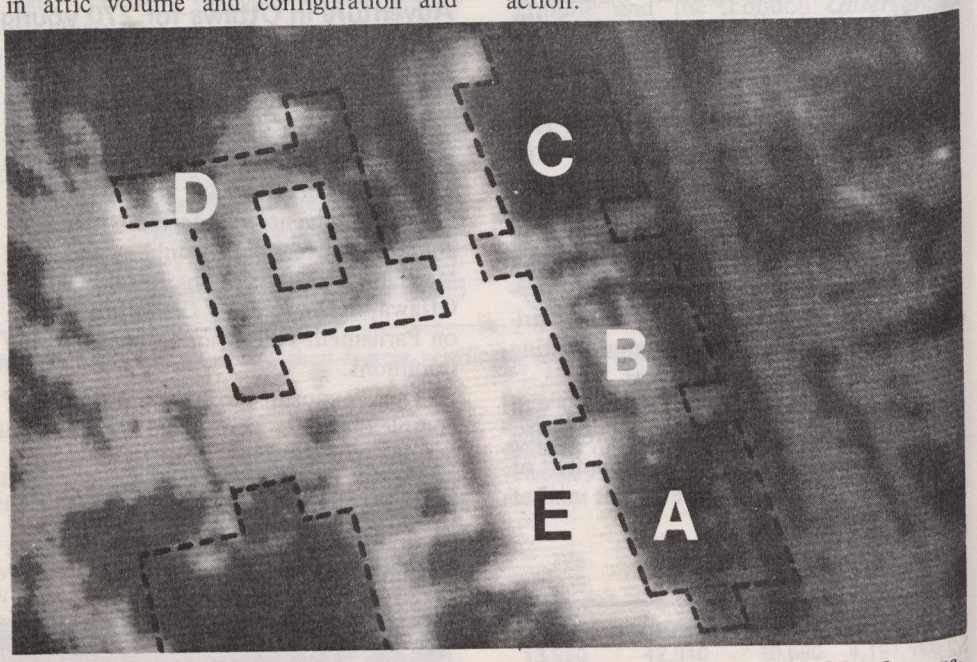
Aerial thermography definitely has a role to play in conservation programs. Its main use is in identifying damaged flat roofs and poorly insulated and/or ventilated residences. It also shows up some poor conservation practices. For instance, thermal heaters in sidewalks or ramps operating when there is no snow or ice to melt, leaks in heat distribution pipes and poor architectural design can all be seen on aerial thermograms.

Aerial thermography cannot tell if a home-owner has turned his thermostat down at night, but it can detect where heat losses are occurring and how big the losses are, and help set priorities for action.



In this imagery of an office complex. A and B are roofs in need of repair, C has been repaired, D is a corridor carrying a heating duct and E is a heated underground garage.

New salmon hatcheries

Work will begin soon on the construction of a $1,795,000-salmon hatchery at Tlupana Inlet in Nootka Sound on the west coast of Vancouver Island.

Also planned under the Federal Government's multi-million dollar Salmonid Enhancement Program is a hatchery on the Puntledge River near Courtenay, British Columbia, to cost an estimated $4,571,000.

When completed, the new facilities are expected to produce an additional half million salmon and steelhead trout for the benefit of commercial and sport fishermen in the province. Total expenditures during the two years of construction will be in the neighbourhood of $6.5 million.

One of the long-range goals of the Salmonid Enhancement Program is to double the number of salmonids available to the commercial and recreational fishermen. In addition to increased numbers of fish the program will also generate significant economic, social and environmental benefits. The first five-year (1977-78 to 1981-82) phase of the program will involve expenditures of about $150 million.