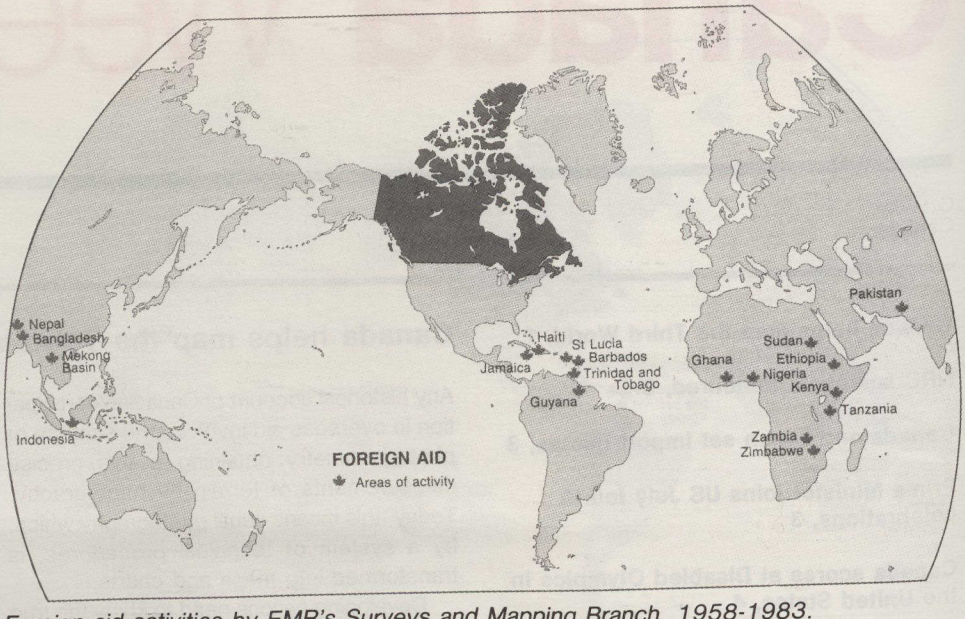
different for each country.

Branch officials also advised about food and water, housing and transportation for Canadian personnel, who had to adjust to local work habits, purchasing procedures and customs clearances.

Typical of some of the conditions under which they worked is this description in a memorandum from a representative in Africa: "There is one main road through the project area and it is unpaved. Roads through smaller villages are not often wide enough to take a Land Rover vehicle.... The only river in the photo mapping area forms the boundary with another country. In the dry season the river has little or no water in it. An attempt will be made to mark the main channel on photographs.

Trails and many of the smaller villages have changed locations to be near a water source. It is quite common for a village to move several miles each year as land becomes less productive and water resources disappear."




*Foreign aid activities by EMR's Surveys and Mapping Branch, 1958-1983.*

**Resourcefulness**

Common to all projects was the resourcefulness of the professionals in meeting and solving formidable difficulties under conditions very strange to them.

In Tanzania, for example, they met an unexpected hazard: war. In the early 1960s Tanganyika (renamed Tanzania in 1964) requested Canada to provide aerial photography, a profile of the land, and photogrammetric compilation. Topographical maps of the area to be covered were to be printed at a scale of 1 : 50 000.

The cost of these services was estimated by Surveys and Mapping experts at $1 million, spread over five years from 1964 to 1968. The contractor, Spartan Air Services of Ottawa, brought in helicopters and a *DC-3* survey aircraft but tensions along the river boundary dividing Tanzania from Portuguese Mozambique were high. The Portuguese were sending fighter aircraft along that boundary and no one could be sure what they might shoot at. They had refused to permit overflights of their territory, which were vital to completion of the photo survey of southern Tanzania. Spartan Air Services went ahead anyway and finished its coverage, fortunately without encounters with fighter aircraft.

**Nepalese contract**

The infrastructure needed and assumed in Canada often did not in fact exist. In 1977, Nepal awarded an air survey contract to Capital Air Services of Ottawa through CIDA. The firm was to mobilize three aircraft to complete aerial photography in three months.

The foreign aid co-ordinator, James I. (Bing) Thompson, who had been to Nepal previously to study the project feasibility, had warned Ottawa authorities.

Weather reporting facilities were virtually non-existent. Even the three aircraft were delayed because they happened to arrive on a religious holiday with no border officials on hand to validate their entry. The air base building was incomplete, with inadequate electrical and water facilities. Canadians had to construct special filtration equipment to enable the project to proceed.

Sometimes the climate was a problem. In March 1962 Canadian Aero Service of Ottawa and Pathfinder Engineering of Vancouver were awarded a contract with Nigeria to map 73 555.66 square kilometres for $1 300 000. Clear skies are essential for satisfactory aerial photography but in this part of Africa clouds often form in the morning and persist throughout the day. A haze rises when winds carrying fine particles of sand blow off the Sahara.

**Challenge met**

Engineers of the firm, under direction of Dr. J.M. Zarzycki, now director of Surveys and Mapping Development Division (EMR), met this challenge with two approaches. First, by aerial triangulation a horizon camera determined the tip and tilt of the aerial camera at the moment of exposure. Second, a camera with a special super-wide lens enabled 1 : 40 000 scale photography at 3 538 square meters just below the main belt of haze. A Doppler instrument in the aircraft guided it on a predetermined flight path and measured distances. In addition special Kodak infrared aerographic film allowed some penetration of the haze, substantially increasing the number of possible days for aerial photography.

Lack of adequate air-conditioned storage for preserving photographic materials was often a problem in tropical climates. In one instance seven large boxes of priceless photo plates were left exposed to heavy rainfall and high humidity. As a result, films were flown to Ottawa for suitable storage even if they were not to be processed there. However, one Asian nation for security reasons refused to authorize the export of aerial film for processing, although they had no suitable photogrammetric equipment of their own.

**Benefits to both sides**

Whatever the challenges, the benefits from Canada's foreign aid work flow to both donor and recipient nations. Canadian engineers, surveyors, pilots, aircrew and mappers, as well as professors and teachers, have been sent abroad. And many foreign personnel have been brought to Canada for university training and for practical experience.

Third World students have come to Canadian universities for training in surveying and mapping, under the auspices of CIDA and its predecessors. From 1968 to 1972, they were invited to attend summer survey training schools staffed and operated by Surveys and Mapping Branch. Staff members were invited on an exchange basis to developing countries to share their Canadian knowledge and know-how.

Foreign aid work provides Canadian air survey firms with a chance to keep men and