

## EXECUTIVE SUMMARY

During the coming decade Canada will have a growing need for several types of surveillance over a variety of activities throughout her vast and largely uninhabited area and the approaches thereto. Evolving technology is providing remarkable new capabilities for surveillance. Canadian science and technology lack major programmes that would make her more competitive on the international scene. Recent changes in the international strategic situation suggest changes in the roles and structure of Canada's armed forces.

This paper attempts to link these four factors. It outlines Canadian needs for surveillance, both for defence and for civilian purposes, and the capabilities and limitations of modern surveillance technology. It discusses the problems of structuring the armed forces to be useful for national functions in a period of international detente, but to be able to continue to perform their military role of deterrence and to be ready for deployment to troubled areas, or for expansion in the event of increased international tension.

Surveillance technology depends on sensors and on platforms. Modern signal processing technology is allowing better and better resolution of radar images. Synthetic aperture radar permits resolution of a few metres for images of stationary objects on the earth's surface, even at ranges of hundreds of kilometres. A different type of radar permits the detection and tracking of aircraft in flight, even when observed from high altitude against the background of the earth. Unfortunately it is not yet possible to combine in a single satellite or aircraft system these two modes of operation, to provide both rapid imaging of areas of the ground in great detail, and the tracking of moving objects.

Modern electro-optical sensors, operating at visual and infrared wavelengths, produce images of very high resolution able to distinguish many details of objects on the surface of the earth, and able to make use of temperature differences as well as reflection of light. They are, however, limited in their ability to operate through obscurant such as cloud, rain, fog, haze, or dust.