

radar, and possibly with their electrical power produced by a small nuclear reactor. A highly sophisticated data processing system would also be necessary. In view of the vital worldwide purpose of the system, and of its inevitably very heavy cost, this would appear to be more suitable for an international than a Canadian undertaking. However, the launching of even one or two satellites would provide some capability, with the potential of subsequently becoming part of a larger system.

For the early warning role, a choice would be available between coverage of all of the globe (i.e. inclinations of nearly 90° for at least some of the constellation) or optimum coverage of a selected barrier line. If this line were around the parallel at 70°N , the latitude of the North Warning System, excellent coverage could be obtained with a smaller constellation, at the expense of poor (or no) coverage north of the barrier.

The most valuable peacetime use of the capability provided by a defence system able to track aircraft continuously would be for air traffic control over vast areas in which no such service exists today. There would also be great potential for search and rescue, fisheries surveillance, and drug interdiction.

It does not seem feasible to provide continuous reliable warning against cruise missile attack, or effective worldwide air traffic control, by any means other than radar deployed in a constellation of satellites. But if this monumental task is undertaken, there seems every prospect that a number of very valuable additional services could be provided as well. This should certainly be the case if it proved feasible to operate the radar in a synthetic aperture mode, producing high resolution images of the ground, as well as in a pulse doppler mode, for detection and tracking of small fast-moving targets. It may be possible to add electro-optical sensors to the radar, providing many additional forms of surveillance for civil as well as military purposes.

A Canada that was determined to be able to participate in the high technology of the next century could undertake a somewhat less ambitious mid-term plan, one within its own financial capabilities. This could be to pursue the RADARSAT project for a satellite with a powerful high-resolution synthetic aperture radar, and at the same time to press research and development of advanced radar and electro-optical technologies