

# NEW DATA SOURCES FOR COMPLETING NATIONAL TOPOGRAPHIC MAPPING OF NORTHERN CANADA AT 1:50,000

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*Complete topographic mapping coverage of Canada is essential as a basis for the sustainable development of its resources. In 2000, the unmapped areas at a scale of 1:50,000 in the Arctic islands in Nunavut and the Northwest Territories, amount to over 800,000 square kilometres, equivalent to approximately 1,500 map sheets. In 2003, a northern mapping project was launched to complete the topographic map coverage in Northern Canada. In order to explore all possible scenarios, the Centre for Topographic Information – Sherbrooke (CTIS) worked closely with the Canadian Space Agency and the private sector on various feasibility tests. After investigating multiple data sources, the combination of existing aerial photography, LANDSAT 7 ETM+, SPOT5/HRS imagery, interferometric pairs of ERS 1-2 tandem and RADARSAT-2 imagery were chosen for planimetric data and Canadian Digital Elevation Data (CDED) acquisition. In 2004, mapping contracts were carried out on a test site and positive results from these tests initiated the production of the unmapped areas of Canada. The planimetric vector data are available on the GeoGratis Web portal and the CDED data sets are available on the GeoBase Web portal.*



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*La cartographie topographique complète du territoire canadien est essentielle pour le développement durable des ressources, car elle assure une géoréférence de base. En 2000, les régions non cartographiées à l'échelle de 1/50 000 dans les îles de l'Arctique au Nunavut et aux Territoires du Nord-Ouest couvraient plus de 800 000 kilomètres carrés, soit environ 1 500 feuillets cartographiques. En 2003, un projet de cartographie topographique du Nord canadien a été initié afin de compléter la couverture cartographique. Différentes technologies satellitaires et scénarios de production ont été investigués par le Centre d'information topographique – Sherbrooke (CIT-S) en collaboration avec l'Agence spatiale canadienne et l'industrie privée pour effectuer des tests de faisabilité. Après avoir testé plusieurs sources de données, des combinaisons de photographies aériennes, d'images des satellites LANDSAT 7 ETM+, SPOT5/HRS, de paires interférométriques ERS1-2 et d'images RADARSAT-2 ont été retenues pour l'acquisition de données planimétriques et altimétriques. En 2004, des contrats de production expérimentale ont été émis sur un site test et les résultats positifs de ces travaux ont permis de débiter la production des zones non cartographiées du Canada. Les données planimétriques vectorielles sont disponibles sur le portail Web GéoGratis et les Données numériques d'élévation du Canada (DNEC) sont disponibles sur le portail Web GéoBase.*

## Introduction

### Unmapped Areas of Canada

The Centre for Topographic Information produces and maintains topographic data for Canada at scales of 1:250,000 and 1:50,000. While the 1:250,000 scale coverage was completed in 1970 [Sebert 1970], the 1:50,000 scale map production was stalled in the late nineties, leaving a large portion of northern Canada unmapped. Complete topographic mapping coverage of Canada's North is essential as a basis for the sustainable development of its resources. The unmapped areas, as of 2003, in the Nunavut and the Northwest Territories amount to over 800,000 square kilometres, equivalent to almost 1,500 map tiles (Figure 1). This is the context in

which the *CartoNord* project was launched. The essential thrust was to develop the capabilities for gathering digital topographic data at the scale of 1:50,000 in northern Canada.

Mapping this area is a big challenge. It is a remote territory with limited access and a short summer season, complicating access to quality checkpoints. The summer length is a critical factor as it's difficult to identify terrain features under snow cover. Cloud cover is also an important factor, as the main data sources are aerial or optical satellites images. The terrain is also variable from