

ENABLING INNOVATION THROUGH GEODETIC TECHNOLOGIES: A PROVINCIAL PERSPECTIVE

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Geodetic technologies enable the measurement of the size, shape and orientation of the Earth, as well as the variation of these parameters over time. Advances in geodetic technology over the past few decades, particularly relating to Global Navigation Satellite Systems (GNSS), have made access to real-time centimetre-level positioning accuracy commonplace. As spatial position information becomes more critical to human and artificial intelligence decision-making processes, innovation has ensued to leverage that information.

A review of key advances in geodetic technology is provided. Examples of innovations that leverage these technologies are presented. It is concluded that the role of geodetic infrastructure will become increasingly important as the backbone for other innovations and that jurisdictions investing resources in this area will be more likely to realize the potential economic benefits and operational efficiencies it creates.



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Les technologies géodésiques permettent de mesurer la taille, la forme et l'orientation de la Terre de même que la variation de ces paramètres au fil du temps. Les progrès accomplis dans le domaine de la technologie géodésique au cours des dernières décennies, particulièrement ceux qui sont reliés au Système mondial de navigation par satellite (GNSS), ont donné accès à une précision courante du positionnement en temps réel de l'ordre du centimètre. Alors que l'information sur la position spatiale devient plus essentielle aux processus décisionnels humain et informatisé (intelligence artificielle), l'innovation s'en est suivie pour tirer parti de cette information.

On examine les principaux progrès en technologie géodésique et on présente des exemples d'innovations qui tirent parti de ces technologies. On conclut que le rôle de l'infrastructure géodésique deviendra de plus en plus important comme principal support à d'autres innovations et que les pays qui investissent des ressources dans ce domaine seront plus susceptibles de réaliser l'efficacité opérationnelle et les avantages économiques potentiels qu'elle crée.

Introduction

Geodesy is the science of accurately measuring and understanding the size and shape of the Earth, its orientation in space and its gravity field. Geodesists are also interested in how these parameters vary over time. The more accurately these values and relationships are known, the better we are able to define position on the Earth [NOAA 2016].

Geodesists assign coordinates to features on the Earth's surface that reflect the geometric and physical models that relate them. These features are commonly referred to as geodetic control points or geodetic control monuments, as they "control" or underpin the position of other features for which coordinates are derived. By measuring from these control monuments using surveying instruments, position can be determined. Figure 1 illustrates a traditional geodetic control monument constructed with concrete, rebar and a brass marker.



Figure 1: Geodetic control monument.