Introduction

One of the most fundamental questions a manager asks is whether the work being performed under his or her direction has sufficient value to justify the related expenses. In other words, cost-benefit analysis is at the heart of management.

Natural Resources Canada (NRCan) provides a service known as Canadian Spatial Reference System Precise Point Positioning (CSRS-PPP) that delivers improved positioning using Global Navigation Satellite Systems (GNSS). NRCan has processed more than 2.05 million GNSS datasets from around the globe with CSRS-PPP since it was inaugurated in late 2003, and considerable information has recently become available about the magnitude and nature of client usage of the service [Klatt and Johnson 2017]. Provision of CSRS-PPP is a costly endeavor requiring significant investment on an annual basis. The question arises whether and to what extent this is a good investment for the Canadian taxpayer. This study answers that question by establishing an approximate value to Canada from CSRS-PPP.

The methodology presented in this report (as with Leveson’s work [2009]) is an economic impact assessment [Smart 2016] based on avoided cost. It involves defining two scenarios: first, the (factual) reference case where clients have access to CSRS-PPP, and second, the counterfactual case where national public active reference services do not exist, which includes CSRS-PPP and the Canadian Active Control System (CACS), a network of continuously operating GNSS receivers that provide differential GSP capability. By excluding both CSRS-PPP and CACS in the counterfactual, clients are limited to commercial networks and passive reference stations.

For each positioning “transaction” (client file processed with CSRS-PPP) an avoided cost is generated for the client. Figure 1 illustrates two means by which a surveyor might obtain the information required, with the avoided cost for this transaction being the difference between $X$ and $Y$. We assume that $Y$ is equal to or greater than $X$ in all cases, as clients will choose the most efficient method.

Figure 1: Reference case versus counterfactual (alternative service usage).