

## Reference Frame Modernization in Canada

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**Abstract.** The United States National Geodetic Survey (NGS) is planning to adopt a new geometric reference frame for the U.S. in 2025 (NATRF2022), which will be based on ITRF2020 and separated from NAD83, the currently adopted frame in both Canada and the U.S., by up to 1.5 meters at the Canada-U.S. border. The Canadian Geodetic Survey (CGS) also plans to adopt NATRF2022 as a new national standard following U.S. adoption, and is collaborating with NGS to define and realise NATRF2022 to ensure reference frame compatibility across both countries. In parallel, CGS is leading an effort to adopt NATRF2022 as a unified reference frame across provincial and other jurisdictions, which have the authority to adopt reference systems used within their own jurisdictions. In this paper, we describe Canadian considerations for the definition and realisation of NATRF2022, and outline efforts and challenges in migrating to NATRF2022 as a unified reference system throughout all jurisdictions in Canada, and maintaining such unification in the future. We will also discuss a new geoid-based height system (NAPGD2022) to be adopted by the U.S. together with NATRF2022, and its implications for Canada, where a geoid-based height system (CGVD2013) has been in place since 2013.