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Space Weather Ionospheric Network Canada

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Space Weather Ionospheric Network Canada (SWINCan), formerly the Canadian High Arctic Ionospheric Network (CHAIN), has provided continuous, near-real-time monitoring of the high-latitude ionosphere since 2007. SWINCan is operated by the Radio and Space Physics Laboratory (RSPL) at the University of New Brunswick (UNB). The network currently consists of 10 high-frequency (HF) ionosondes, 30 Global Navigation Satellite System (GNSS) total electron content and scintillation monitors (GISTMs), and 14 "low-cost"GNSS receivers spanning northern sub-auroral, auroral, and polar regions. SWINCan also includes 1 GISTM in sub-auroral Antarctica for interhemispheric and collaborative southern ionosphere studies.

There is growing demand for enhanced capacity to observe the high-latitude ionosphere, largely motivated by renewed urgency for increased Arctic domain awareness in support of governance, security, development, and scientific research among Arctic nations. In response, RSPL is substantially expanding SWINCan to include a total of 131 GISTMs and 21 ionosonde systems across Canada, while modernizing its ionosonde network with deployment of "sanimut", a state-of-the-art, fully versatile HF platform. The complete SWINCan network will provide continuous, near-real-time (NRT) monitoring of the multi-scale ionospheric structure and dynamics at high-latitudes with unprecedented detail and revolutionize our ability to fundamentally understand the physical mechanisms that drive ionospheric variability and influence the trans-ionospheric propagation of radio waves. Given the continuous and unpredictable structuring of the high-latitude ionosphere over a broad range of spatial scales, SWINCan observations provide essential input for ionosphere assimilations models and other adaptive operational strategies of over-the-horizon-radar (OTHR), radio communication systems, and position, navigation, and timing (PNT) systems.

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Keyword-3

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