**Nicholas Ssessanga Research interests**

Research interests focus on ionospheric studies, particularly ionospheric modeling, tomography and data assimilation.

**Current project:**

* The development of an in-house high-latitude regional 4D ionosphere specification technique: The project aims to exploit sophisticated data assimilation (DA) and tomography methods to accurately specify and forecast the 3D flow of densities at high latitude regions while integrating both ground-based and space-based linear and non-linear observations. The reconstructed 3D ionosphere electron density maps will provide a comprehensive understanding of ionospheric behaviour in challenging high-latitude environments and support error correction for single-frequency GNSS users and prediction of HF radio wave propagation-widely used during disasters and ship and aircraft communications.

**Other projects**

* The development of Ionospheric 3D Tomography-3DVar near-real-time regional specification technique with Data from GNSS and Ionosonde. Currently being tested on the near-detection of ionospheric disturbances over Japan- following the eruption of Hunga Tonga-Hunga Ha'apai on 15 January 2022; in collaboration with ENRI (Electronic Navigation Research Institute, National Institute of Maritime, Port and Aviation Technology, Japan) and RISH (Research Institute of Sustainable Humanosphere, Kyoto University, Japan).
* Imaging Nighttime Mid-latitude E-F Coupling in Geomagnetic Conjugate Ionospheres using a Double Thin Shell Model and a Multi-Source Data Investigation; in collaboration with RISH

* High resolution 3-D Imaging of Daytime Sporadic-E Over Japan by Using GNSS and ionosondes; in collaboration with RISH