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Advancing Research through Modular Instrumentation

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Characterization and calibration of measurement instruments is vital to meaningful and traceable data acquisition. However, the complexity of commonly involved systems has long surpassed the scope of what a single person is able to develop, operate, and maintain on their own. In addition, academic interests evolve and regularly require experimental setups to be reconfigured based on lessons learned in the field. Budgetary constraints, diversity in project scopes, short-term measurement campaigns, and student turnover place further demands on the operation and maintenance of instrumentation in an academic environment.

This presentation shares insights and experience from the development of the modular measurement platform 'sanimut' to its operation in the Canadian Arctic today. While initial considerations were dominated by budget and supply chain management, a variety of tools and methods has emerged and continues to boost development efficiency, stimulates new projects, and fosters student involvement. The modular circuit board designs, simulation of gateware and analog circuitry, as well as application interface resources continue to contribute to experiment design, parametric studies, as well as ease of maintenance in the field. The system is segmented into individual building blocks with unique and comprehensible characteristics. This enables independent optimization, incremental updates, and partial reconfiguration of existing instruments. It facilitates tailoring contributions and training that align personnel experience with project scope. While the examples are specific, the discussed methodology and conclusions are general and are relevant to ionospheric observation and beyond.

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Keyword-2

modular

Keyword-3

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