

Interactive comment on “A low-power data acquisition system for geomagnetic observatories and variometer stations” by Achim Morschhauser et al.

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There are many data acquisition systems for geomagnetism, some of which are listed in the Introduction Page 2 Lines 3-6, and some which are open source and invite community participation in development. This paper describes another open source system and also invites community participation and uses mostly off the shelf components. It therefore introduces a useful candidate for a potentially globally adopted geomagnetic observatory data acquisition system. I support the paper.

The initial C version of the software, and the hardware has been developed and tested to prove the potential of the system. The C++ version is the focus of this paper, and I would encourage as much input from as many observatory groups as possible on

the requirements of such as a system to encourage widespread adoption – particularly those that have produced similar systems for installations beyond their immediate national interests.

Due to its low power requirements, the system would also be useful for geomagnetic repeat station surveys, and could be adapted to also measure electric fields in conductivity studies. If software development proceeds in the appropriate direction, it could also support magnetometer calibration systems. It would be useful to point out these, and perhaps other, uses of the system described in this paper to encourage its adoption.

Page 6 Figure 3. Some details of the LTP (lightning protection) such as part numbers (if Off The Shelf products) would be useful.

Page 6 Section 3.2.1 Power supply chain Line 12. Is effective transmission of electric energy really an issue over the short distances involved requiring 12 VDC-220 VAC complications? It might be desirable for elimination of DC fields associated a DC power transmission though.

Page 7 Section 3.2.2 Photovoltaic system. The DC charging currents into batteries in early morning (after overnight discharge) can be quite large – has any estimation of the distance required between the batteries and charging system from the magnetometer sensors, or the configuration of the charging system, to avoid magnetic contamination been made?

Page 7 Table 1. Rather than include non-essential items (Notebook) and then say it could be excluded or replaced by a lower power device, wouldn't it be better to include only essential items and note that other items could be added at a power cost?

Page 9 Section 4.2 Timestamping and Time keeping. Is all timekeeping accomplished through NTP with no specialised GPS processing? If so, does this limit the selection of GPS clocks (that can be used to be compatible with the ntpd program available on the

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Page 10 Section 4.3 Datalogging and Filtering. There is mention of data being written to binary files or transmitted (using MQTT for example). How is the implemented system at Niemegk or Tatuoca recording its data – for example to the elsewhere mentioned external HDD or SSD. Have you selected a binary file format reliable through power failures and which can be rsync'd in real time without corrupting the file, or installed a local MQTT server that can provide data through long communication dropouts or power failures? Delivering the data is the ultimate goal of the system, and the paper seems a little light on detail, although it offers suggestion on what could be done.

Interactive comment

Typo remarks: Page 2 Introduction Line 11 Niemgk spelling compared to Line 14 Niemegk

Page 3 Section 3.1 Data Acquisition Line 25 Fig XX

Page 4 Figure 1. “On the right hand side” is used twice to describe both left hand side and right hand side. The first “right hand side” should be “left hand side”.

Page 5 Figure 2. The GPS antenna is shown, but the GPS is not shown.

Page 6 Figure 3. “A power inverter (PWI) transforms 10 VDC of the buffer batteries to 220 VAC” Did you mean 12 VDC as in the diagram?

Page 6 Section 3.2 Power Supply Line 2 “options to generate and store power. a_ landline require_” (capitalisation and plurality). Should you say “Grid (or Mains) power requires ...”

Page 11 Section 6 Code availability Line 29 “at <https://gitext.gfz-potsdam.de/mors/GeomagLogger>” runs off the right margin on my PDF and the final characters are not visible. It is a repeat of Page 11 Section 5 Conclusions and Outlook Line 11.

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