Low-cost Implementation and Characterization of an Active Phasor Data Concentrator

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# **Summary of changes**

This paper is the extended version of the paper “Low-cost Implementation of an Active Phasor Data Concentrator for Smart Grid” by Paolo Castello, Carlo Muscas, Paolo Attilio Pegoraro and Sara Sulis presented at “2018 IEEE International Workshop on Metrology for Industry 4.0 and IoT”.

The paper has been extended with respect to the conference version to investigate the feasibility of the proposed prototype to evaluate the input measurement data provided by the PMU and to implement control logic. The proposed prototype, driven by the good results obtained in the characterization context, was moved to a real monitoring and control test scenario.

In particular, for this extended version:

* The introduction has been deeply revised and expanded.
* Section 2 has been introduced to describe the PDC functionalities suggested by the IEEE C37.244-2013 - IEEE Guide for Phasor Data Concentrator Requirements for Power System Protection, Control, and Monitoring.
* The test setup and results section has been divided in “Characterization of the PDC prototype” (Section 4) and “Prototype behaviour in a real scenario” (Section 5) to better contextualize the scope of the proposal.
* The Section 5.2 introduces the new results obtained from the real measurement and control scenario. The following contributions have been added in the section:
	+ The PDC functionality is expanded to implement a control logic relying on measurement data processing and digital output.
	+ A synchronized calibrator is used to test a complete measurement and control chain where the PDC relies on a simple frequency change detection to trigger its digital output.
	+ An overall delay characterization is performed to show the relationship between measurement device configuration, input data latency and processing time.

Thank you very much for your attention,

Yours faithfully,

Paolo Castello

On behalf of my co-authors

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