
CONTRA - High Power Density Controllable Transformers for On-Board Chargers

A Data Management Plan created using DMPonline.be

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Project Administrator: Wilmar Martinez Martinez

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Project abstract:

Controllable Transformers have been employed in isolated and resonant converters to unlock their full potential. Extension of the soft switching regions, reduction in the effective currents under wide voltage operation, and quasi-fixed frequency operation have been accomplished. Nevertheless, power density is still one of the main pitfalls to overcome in order to take the technology to valorisation. It was already proven that Controllable Transformers could increase the efficiency of isolated power converters for battery charging, which has big potential for the industry. The CONTRA project aims to increase the power density of transformers in onboard chargers by employing planar controllable magnetic components and proving them effective in power converters. The project proposes using DAB and LLC converters with a planar Controllable Transformer implementation, possibly nanocrystalline materials, to reduce stray inductance and increase voltage gain power levels. In this way, CONTRA can take this technology to the level of valorisation and exploitation.

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Research Data Summary

List and describe all datasets or research materials that you plan to generate/collect or reuse during your research project. For each dataset or data type (observational, experimental etc.), provide a short name & description (sufficient for yourself to know what data it is about), indicate whether the data are newly generated/collected or reused, digital or physical, also indicate the type of the data (the kind of content), its technical format (file extension), and an estimate of the upper limit of the volume of the data.

Dataset name / ID	Description	New or reuse	Digital or Physical data	Data Type	File format	Data volume
		<i>Indicate: N(ew data) or E(xisting data)</i>	<i>Indicate: D(igital) or P(hysical)</i>	Indicate: Audiovisual Images Sound Numerical Textual Model Software Other (specify)		Indicate: <1GB <100GB <1TB <5TB >5TB NA
DAB_ECT_Exp	Experimental Voltage, Currents, driving signals and efficiency of a DAB converter having an electrically controlled transformer	N	D	N	*.xlsx	<1GB
LLC_ECT_Exp	Experimental Voltage, Currents, driving signals and efficiency of a LLC converter having an electrically controlled transformer	N	D	N	*.xlsx	<1GB
DAB_ECT2_Exp	Experimental Voltage, Currents, driving signals and efficiency of DAB converter having two electrically controlled transformers	N	D	N	*.xlsx	<1GB
DAB_ECT_CirSim	Circuit simulation file DAB+ electrically controlled transformer	N	D	M	*.plecs	
DAB_ECT2_CirSim	Circuit simulation file DAB+ two electrically controlled transformer	N	D	M	*.plecs	
DAB_LLC_CirSim	Circuit simulation file DAB+ electrically controlled transformer	N	D	M	*.plecs	
DAB_ECT_uC	micro-controller program for the DAB_ECT (Code Composer Studio)	N	D	SO	*.out	<1GB
DAB_ECT2_uC	micro-controller program for the DAB_ECT2 (Code Composer Studio)	N	D	SO	*.out	<1GB
LLC_ECT_uC	micro-controller program for the DAB_ECT2 (Code Composer Studio)	N	D	SO	*.out	<1GB
DAB_ECT_PCB	PCB files DAB_ECT (Altium project)	N	D	M	*. SchDoc and *. PcbDoc	<1GB
DAB_ECT2_PCB	PCB files DAB_ECT2 (Altium project)	N	D	M	*. SchDoc and *. PcbDoc	<1GB
LLC_ECT2_PCB	PCB files LLC_ECT (Altium project)	N	D	M	*. SchDoc and *. PcbDoc	<1GB
DAB_ECT_TrafoSim	Trafo simulation files (Ansys Maxwell)	N	D	M	*.aedt	<1GB
DAB_ECT2_TrafoSim	Trafo simulation files (Ansys Maxwell)	N	D	M	*.aedt	<1GB
DAB_LLC_TrafoSim	Trafo simulation files (Ansys Maxwell)	N	D	M	*.aedt	<1GB
DAB+VT repot	Analysis results and conclusions of the implementation of a DAB converter having an electrically controlled transformer	N	D	T	*.pdf	<1GB
LLC+VT report	Analysis results and conclusions of the implementation of a LLC converter having an electrically controlled transformer	N	D	T	*.pdf	<1GB

If you reuse existing data, please specify the source, preferably by using a persistent identifier (e.g. DOI, Handle, URL etc.) per dataset or data type:

NA

Are there any ethical issues concerning the creation and/or use of the data (e.g. experiments on humans or animals, dual use)? If so, refer to specific datasets or data types when appropriate and provide the relevant ethical approval number.

- No

Will you process personal data? If so, please refer to specific datasets or data types when appropriate and provide the KU Leuven or UZ Leuven privacy register number (G or S number).

- No

Does your work have potential for commercial valorization (e.g. tech transfer, for example spin-offs, commercial exploitation, ...)? If so, please comment per dataset or data type where appropriate.

- Yes

Circuit simulation files specify the way the power converter and the transformer operates, as such, it has the potential to be valorized,

DAB_ECT_CirSim

DAB_ECT2_CirSim

DAB_LLC_CirSim

Printed Board Circuits and circuit schematics provide the required information to assemble the power converter and the transformer and constitute fundamental information of the solution to be valorized.

DAB_ECT_PCB

DAB_ECT2_PCB

LLC_ECT2_PCB

Written reports detail the principles, circuit topologies, modulation techniques and performance indicators of the power converter and the transformer. Therefore, these documents contain relevant information subject to valorization.

DAB+VT report

LLC+VT report

Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material or Data transfer agreements, Research collaboration agreements)? If so, please explain in the comment section to what data they relate and what restrictions are in place.

- No

Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use? If so, please explain in the comment section to what data they relate and which restrictions will be asserted.

- No

Documentation and Metadata

Clearly describe what approach will be followed to capture the accompanying information necessary to keep data understandable and usable, for yourself and others, now and in the future (e.g. in terms of documentation levels and types required, procedures used, Electronic Lab Notebooks, README.txt files, codebook.tsv etc. where this information is recorded).

- Measurements datasets (DAB_ECT_Exp,DAB_ECT2_Exp, LLC_ECT_Exp) will contain **in file** information describing the measurement setup, equipment employed and notes in separate tab of the file .
- Circuit simulation files datasets will include a **readme file** describing its content (DAB_ECT_Sim,DAB_ECT2_Sim, LLC_ECT_Sim)
- Micro controller scripts (DAB_ECT_uC,DAB_ECT2_uC, LLC_ECT_uC) will contain **in file** information as comments describing the code functions and variables
- Printed circuit board and schemataic files (DAB_ECT_PCB,DAB_ECT2_PCB, LLC_ECT_PCB) will contain **in file** comments describing the power converter plans and special considerations for implementation.
- Finite simulation files (DAB_ECT_TrafoSim,DAB_ECT2_TrafoSim, LLC_ECT_TrafoSim) will contain a **read me** file describing the simulation results cotained in there.

Will a metadata standard be used to make it easier to find and reuse the data?

If so, please specify which metadata standard will be used.

If not, please specify which metadata will be created to make the data easier to find and reuse.

- Yes

regular KU Leuven regulations. RDR will be used

Data Storage & Back-up during the Research Project

Where will the data be stored?

- OneDrive (KU Leuven)
- Sharepoint online

EnergyVille share point will be used to store the data generated in the project

How will the data be backed up?

- Standard back-up provided by KU Leuven ICTS for my storage solution

Is there currently sufficient storage & backup capacity during the project?

If no or insufficient storage or backup capacities are available, explain how this will be taken care of.

- Yes

How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons?

Energy Ville Share point lets to define different access levels where it can be easily defined wich users within the organization have access to the project files

What are the expected costs for data storage and backup during the research project? How will these costs be covered?

Data in Contra wont be excesive. Exisiting servers will be used.

Data Preservation after the end of the Research Project

Which data will be retained for 10 years (or longer, in agreement with other retention policies that are applicable) after the end of the project?

In case some data cannot be preserved, clearly state the reasons for this (e.g. legal or contractual restrictions, storage/budget issues, institutional policies...).

- All data will be preserved for 10 years according to KU Leuven RDM policy

Where will these data be archived (stored and curated for the long-term)?

- KU Leuven RDR

What are the expected costs for data preservation during the expected retention period? How will these costs be covered?

The long-term storage is guaranteed up to 10 years after the end of a project. This is stored on servers in Leuven, on the K-disk. The members of the research group have access to the data with the permission of the supervisor.

Data Sharing and Reuse

Will the data (or part of the data) be made available for reuse after/during the project?

Please explain per dataset or data type which data will be made available.

- Yes, as restricted data (upon approval, or institutional access only)

If access is restricted, please specify who will be able to access the data and under what conditions.

The collected data will be accessible to the PhD and PostDoc researchers, Diego Bernal and Camilo Suarez, and the responsible supervisors of the C2 project prof. Wilmar Martinez.

Are there any factors that restrict or prevent the sharing of (some of) the data (e.g. as defined in an agreement with a 3rd party, legal restrictions)?

Please explain per dataset or data type where appropriate.

- Yes, intellectual property rights

Where will the data be made available?

If already known, please provide a repository per dataset or data type.

- KU Leuven RDR (Research Data Repository)

When will the data be made available?

- Upon publication of research results

Which data usage licenses are you going to provide?

If none, please explain why.

- Other (specify below)

Do you intend to add a persistent identifier (PID) to your dataset(s), e.g. a DOI or accession number? If already available, please provide it here.

- Yes, a PID will be added upon deposit in a data repository

What are the expected costs for data sharing? How will these costs be covered?

No additional cost are foreseen

Responsibilities

Who will manage data documentation and metadata during the research project?

PostDoc researcher, Camilo Suarez

Who will manage data storage and backup during the research project?

PostDoc researcher, Camilo Suarez

Who will manage data preservation and sharing?

Project supervisor, prof. Wilmar Martinez

Who will update and implement this DMP?

PostDoc researcher, Camilo Suarez