GLOSRAD – Global Shutter Radiation-tolerant CMOS image sensor pixels

A Data Management Plan created using DMPonline.be

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Project abstract:

Radiation-tolerant pixels for image sensors have been developed for moderate and high levels of total ionizing dose (TID) based upon CMOS image sensor (CIS) technology. However, this are all rolling-shutter pixels, which means that every row in the image has a slightly shifted exposure period. For most machine vision and scientific applications, a global shutter pixel is needed, in which all pixels acquire the image at the same time. This requires an extra memory element in the pixel, besides the photodiode, to store the photosignal after the exposure time. This storage region must also be tolerant to TID effects. This project aims at developing radiation-hardened global shutter pixels with a radiation tolerance up to 1 MGray TID. It includes experiments to design, prototype, evaluate and compares pixel charge storage regions and global pixel shutter architectures, using a state-of-the-art CIS process.

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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	Physical volume
electronic design database	*Design database of integrated circuits: schematics, layout, simulation results*	*N*	D	Cadence OA	Cadence OA propretary format GDS-II file	< 100 GB	esat server
electronic measurement data	*Measurement data acquired during electronic tests in lab*	N	D	*Format varies depending on equipment. See data storage on how we manage this*	raw data	< 10 GB	esat server
irradatation results	*Irradiation results acquired during testbeam campaigns*	N	D	*Format varies depending on equipment. See data storage on how we manage this*	raw data	< 10 GB	esat server
reports	design/development reports and test reports	N	D	document	pdf	< 1 GB	KUL onedrive project folder

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:

no re-use of existing data

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

Yes, restrictions will be asserted for the design database.

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.

- Yes

Yes, restrictions will be asserted for the design database.

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).

Data type	*Metadata*
Electronic design database	*Designs are documented following our own internal data management plan: https://iiw.kuleuven.be/onderzoek/advise/dmp*
Electronic measurements	*Raw data is accompagnied with a description file that contains the conditions, setup of the acquired results. An executable is stored along the data to reproduce the results as well as a manual how to reproduce the analysis.*
Irradiation results	*Same as "Electronic Measurements"*
Reports	*Reports are stored per date and milestone*

Will a metadata standard be used to make it easier tofind 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.

- No

Data Storage & Back-up during the Research Project

Where will the data be stored?

- Other (specify below)

Data type	*storage*
Electronic design database	*Linux storage provided by ESAT (dept. Electrical Engineering). Designs are synced to a github repository hosted on ESAT server.*
Electronic measurements	*Same as Electronic design database*
Irradiation results	*Same as Electronic design database*
Reports	*Project one-drive*

How will the data be backed up?

- Other (specify below)

Data type	*storage*
Electronic design database	*Linux storage provided by ESAT (dept. Electrical Engineering) with ensured secure backup.*
Electronic measurements	*Same as Electronic design database*
Irradiation results	*Same as Electronic design database*
Reports	*Project one-drive hosted by KU Leuven*

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

ESAT provides storage capability in the department data center

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

ESAT computer account management.

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

Cost is part of an annual user account fee to ESAT and included in project costs.

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)?

- Other (specify below)

ESAT servers data center + back-ups provided by ESAT.

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

Costs are part of the user account fees.

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.

- No (closed access)

No data will be made available because of IP potential.

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

Project collaborators and supervisor.

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

design database access is restricted.

Where will the data be made available?

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

- Other (specify below)

N/A

When will the data be made available?

- Other (specify below)

N/A.

Which data usage licenses are you going to provide?

If none, please explain why.

- Other (specify below)

N/A.

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.

- No

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

N/A

Responsibilities

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

Guy Meynants

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

Guy Meynants

Who will manage data preservation and sharing?

Guy Meynants

Who will update and implement this DMP?

Guy Meynants