

FWO DMP Template - Flemish Standard Data Management Plan

Project supervisors (from application round 2018 onwards) and fellows (from application round 2020 onwards) will, upon being awarded their project or fellowship, be invited to develop their answers to the data management related questions into a DMP. The FWO expects a **completed DMP no later than 6 months after the official start date** of the project or fellowship. The DMP should not be submitted to FWO but to the research co-ordination office of the host institute; FWO may request the DMP in a random check.

At the end of the project, the **final version of the DMP** has to be added to the final report of the project; this should be submitted to FWO by the supervisor-spokesperson through FWO's e-portal. This DMP may of course have been updated since its first version. The DMP is an element in the final evaluation of the project by the relevant expert panel. Both the DMP submitted within the first 6 months after the start date and the final DMP may use this template.

The DMP template used by the Research Foundation Flanders (FWO) corresponds with the Flemish Standard Data Management Plan. This Flemish Standard DMP was developed by the Flemish Research Data Network (FRDN) Task Force DMP which comprises representatives of all Flemish funders and research institutions. This is a standardized DMP template based on the previous FWO template that contains the core requirements for data management planning. To increase understanding and facilitate completion of the DMP, a standardized **glossary** of definitions and abbreviations is available via the following [link](#).

1. General Project Information

Name Grant Holder & ORCID	Adham Sakhnini (0000-0001-7183-705X)
Contributor name(s) (+ ORCID) & roles	Sofie Pollin (0000-0002-1470-2076) André Bourdoux (0000-0002-9264-7850)
Project number ¹ & title	Joint Radar and Communications in Distributed MIMO Systems
Funder(s) GrantID ²	1S16523N
Affiliation(s)	<input checked="" type="checkbox"/> KU Leuven <input type="checkbox"/> Universiteit Antwerpen <input type="checkbox"/> Universiteit Gent <input type="checkbox"/> Universiteit Hasselt <input type="checkbox"/> Vrije Universiteit Brussel <input type="checkbox"/> Other: IMEC Provide ROR ³ identifier when possible:

¹ "Project number" refers to the institutional project number. This question is optional since not every institution has an internal project number different from the GrantID. Applicants can only provide one project number.

² Funder(s) GrantID refers to the number of the DMP at the funder(s), here one can specify multiple GrantIDs if multiple funding sources were used.

³ Research Organization Registry Community. <https://ror.org/>

<p>Please provide a short project description</p>	<p>Integrating radar functionalities into current and future wireless communication networks is an under-explored research area with extensive opportunities and large potential societal impacts. In essence, the integration seeks to add sensing capabilities to communication systems by processing echoes originating from interacting objects in the environment, exploiting the inherent multipath geometry to extract location, velocity and amplitude information. The added functionality enables environmental awareness and is expected to give rise to a wide range of new applications such as surveillance, health, smart home and factory services, with a final vision of also improving the communication system at hand.</p> <p>This project targets future distributed communication systems expected in 6G and beyond, with an estimated impact-horizon of 5-15 years. The main objective is to integrate radar sensing functionalities into distributed communication systems with minimal overhead and hardware modifications.</p> <p>Three key research problems are:</p> <ol style="list-style-type: none"> 1) Developing distributed transmission and processing protocols for joint communication and sensing. 2) Relaxing the hardware requirements (e.g., synchronization, spillover) of the radar system to accommodate the communication system through novel signal processing and system designs. 3) Scheduling and managing the available resources (e.g., time, frequency, space and power) in order to strike a balance between radar and communications performance.
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2. 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 data⁴.

				ONLY FOR DIGITAL DATA	ONLY FOR DIGITAL DATA	ONLY FOR DIGITAL DATA	ONLY FOR PHYSICAL DATA
Dataset Name	Description	New or Reused	Digital or Physical	Digital Data Type	Digital Data Format	Digital Data Volume (MB, GB, TB)	Physical Volume
		<input type="checkbox"/> Generate new data <input type="checkbox"/> Reuse existing data	<input type="checkbox"/> Digital <input type="checkbox"/> Physical	<input type="checkbox"/> Observational <input type="checkbox"/> Experimental <input type="checkbox"/> Compiled/aggregated data <input type="checkbox"/> Simulation data <input type="checkbox"/> Software <input type="checkbox"/> Other <input type="checkbox"/> NA	<input type="checkbox"/> .por <input type="checkbox"/> .xml <input type="checkbox"/> .tab <input type="checkbox"/> .csv <input type="checkbox"/> .pdf <input type="checkbox"/> .txt <input type="checkbox"/> .rtf <input type="checkbox"/> .dwg <input type="checkbox"/> .tab <input type="checkbox"/> .gml <input type="checkbox"/> other: <input type="checkbox"/> NA	<input type="checkbox"/> < 100 MB <input type="checkbox"/> < 1 GB <input type="checkbox"/> < 100 GB <input type="checkbox"/> < 1 TB <input type="checkbox"/> < 5 TB <input type="checkbox"/> < 10 TB <input type="checkbox"/> < 50 TB <input type="checkbox"/> > 50 TB <input type="checkbox"/> NA	
Radar-Communication simulations	Numerical analysis	Generate new data	Digital	Simulation data and software	Binary (IQ) data	<1 TB	
Spillover-cancellation	Hardware	Generate new data	Digital	Experimental data	Binary (IQ) data	<1 TB	

⁴ Add rows for each dataset you want to describe.

	demonstration of simultaneous radar and spillover cancellation			and software			
<p>GUIDANCE:</p> <p>DATA CAN BE DIGITAL OR PHYSICAL (FOR EXAMPLE BIOBANK, BIOLOGICAL SAMPLES, ...). DATA TYPE: DATA ARE OFTEN GROUPED BY TYPE (OBSERVATIONAL, EXPERIMENTAL ETC.), FORMAT AND/OR COLLECTION/GENERATION METHOD.</p> <p>EXAMPLES OF DATA TYPES: OBSERVATIONAL (E.G. SURVEY RESULTS, SENSOR READINGS, SENSORY OBSERVATIONS); EXPERIMENTAL (E.G. MICROSCOPY, SPECTROSCOPY, CHROMATOGRAMS, GENE SEQUENCES); COMPILED/AGGREGATED DATA⁵ (E.G. TEXT & DATA MINING, DERIVED VARIABLES, 3D MODELLING); SIMULATION DATA (E.G. CLIMATE MODELS); SOFTWARE, ETC.</p> <p>EXAMPLES OF DATA FORMATS: TABULAR DATA (.POR, .SPSS, STRUCTURED TEXT OR MARK-UP FILE XML, .TAB, .CSV), TEXTUAL DATA (.RTF, .XML, .TXT), GEOSPATIAL DATA (.DWG, .GML, ..), IMAGE DATA, AUDIO DATA, VIDEO DATA, DOCUMENTATION & COMPUTATIONAL SCRIPT.</p> <p>DIGITAL DATA VOLUME: PLEASE ESTIMATE THE UPPER LIMIT OF THE VOLUME OF THE DATA PER DATASET OR DATA TYPE.</p> <p>PHYSICAL VOLUME: PLEASE ESTIMATE THE PHYSICAL VOLUME OF THE RESEARCH MATERIALS (FOR EXAMPLE THE NUMBER OF RELEVANT BIOLOGICAL SAMPLES THAT NEED TO BE STORED AND PRESERVED DURING THE PROJECT AND/OR AFTER).</p>							
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.		-					

⁵ These data are generated by combining multiple existing datasets.

<p>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, please describe these issues further and refer to specific datasets or data types when appropriate.</p>	<p> <input type="checkbox"/> Yes, human subject data <input type="checkbox"/> Yes, animal data <input type="checkbox"/> Yes, dual use <input checked="" type="checkbox"/> [X] No If yes, please describe: </p>
<p>Will you process personal data⁶? If so, briefly describe the kind of personal data you will use. Please refer to specific datasets or data types when appropriate. If available, add the reference to your file in your host institution's privacy register.</p>	<p> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> [X] No If yes: <ul style="list-style-type: none"> - Short description of the kind of personal data that will be used: - Privacy Registry Reference: </p>
<p>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.</p>	<p> <input type="checkbox"/> [X] Yes <input type="checkbox"/> No If yes, please comment: The simulations and experimental provide insights into the design choices of developing radar-communication systems. Furthermore, there is significant expertise involved. This is relevant with respect to the roadmap of the ARF department at IMEC. Some of the research output has also served as the basis for patent applications through IMEC/KU Leuven. </p>

⁶ See Glossary Flemish Standard Data Management Plan

<p>Do existing 3rd party agreements restrict exploitation or dissemination of the data you (re)use (e.g. Material/Data transfer agreements, research collaboration agreements)?</p> <p>If so, please explain to what data they relate and what restrictions are in place.</p>	<p><input type="checkbox"/> [X] Yes <input type="checkbox"/> No</p> <p>If yes, please explain: The research is carried out at IMEC who has the final saying in the dissemination. Openness and reproducibility are key, but it must be balanced with the preservation of important know-hows which can serve as business advantages. Disseminating data with descriptions that allow for reproducibility can be done on request given approval, but sharing software, programming codes and procedures will be avoided.</p>
<p>Are there any other legal issues, such as intellectual property rights and ownership, to be managed related to the data you (re)use?</p> <p>If so, please explain to what data they relate and which restrictions will be asserted.</p>	<p><input type="checkbox"/> [X] Yes <input type="checkbox"/> No</p> <p>If yes, please explain: The ownership and IP (Intellectual Property) is under the terms of IMEC</p>

3. Documentation and Metadata

<p>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).</p>	<p>If the material is published, then the relevant information is in the paper. This includes system parameters such as carrier frequency, sampling rate, bandwidth etc. When stored internally, there will be associated software for reading the data and text-files with meta-data. The meta-data includes system parameters (such as sampling rate, carrier frequency, etc) and is typically included in the documentation (e.g., docstrings or accompanied text files). Software and computer codes for reading the data is available when relevant.</p>
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<p>Will a metadata standard be used to make it easier to find and reuse the data?</p> <p>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.</p> <p><i>REPOSITORIES COULD ASK TO DELIVER METADATA IN A CERTAIN FORMAT, WITH SPECIFIED ONTOLOGIES AND VOCABULARIES, I.E. STANDARD LISTS WITH UNIQUE IDENTIFIERS.</i></p>	<p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> [x] No</p> <p>If yes, please specify (where appropriate per dataset or data type) which metadata standard will be used:</p> <p>If no, please specify (where appropriate per dataset or data type) which metadata will be created:</p> <p>The meta-data is in readable text and consists of radio frequency parameters, data format, etc.</p>
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4. Data Storage & Back-up during the Research Project	
<p>Where will the data be stored?</p>	<p>At IMEC servers/SSDs/computers and/or researchers' SSDs/computer</p>
<p>How will the data be backed up?</p> <p><i>WHAT STORAGE AND BACKUP PROCEDURES WILL BE IN PLACE TO PREVENT DATA LOSS? DESCRIBE THE LOCATIONS, STORAGE MEDIA AND PROCEDURES THAT WILL BE USED FOR STORING AND BACKING UP DIGITAL AND NON-DIGITAL DATA DURING RESEARCH.⁷</i></p> <p><i>REFER TO INSTITUTION-SPECIFIC POLICIES REGARDING BACKUP PROCEDURES WHEN APPROPRIATE.</i></p>	<p>The data will be backed up through a USB cable to at least one SSD and stored on a bookshelf. Some data will also be backed up to IMEC servers and stored in the cloud.</p>

⁷ Source: Ghent University Generic DMP Evaluation Rubric: <https://osf.io/2z5g3/>

Is there currently sufficient storage & backup capacity during the project? If yes, specify concisely. If no or insufficient storage or backup capacities are available, then explain how this will be taken care of.	<input type="checkbox"/> [X] Yes <input type="checkbox"/> No If yes, please specify concisely: SSDs and IMEC servers If no, please specify:
How will you ensure that the data are securely stored and not accessed or modified by unauthorized persons? <i>CLEARLY DESCRIBE THE MEASURES (IN TERMS OF PHYSICAL SECURITY, NETWORK SECURITY, AND SECURITY OF COMPUTER SYSTEMS AND FILES) THAT WILL BE TAKEN TO ENSURE THAT STORED AND TRANSFERRED DATA ARE SAFE. ⁷</i>	The data is either stored at IMEC or in researchers' laptop/SSD. These will be kept away from potentially hazardous environment. A potential (physical/virtual) theft is considered unlikely.
What are the expected costs for data storage and backup during the research project? How will these costs be covered?	In the order of a few hundred euros; this will be taken care of by IMEC / the researcher.

5. Data Preservation after the end of the Research Project

Which data will be retained for at least five 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...).	Experimental data (spillover cancellation) will be retained for the time that IMEC wishes to keep it. This will likely be more than five years. Simulation data will typically not be stored for long term use as this can be reproduced with programming codes.
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Where will these data be archived (stored and curated for the long-term)?	At IMEC servers and hard drivers.
What are the expected costs for data preservation during the expected retention period? How will these costs be covered?	The costs are included in the internal budgeting.

6. Data Sharing and Reuse

<p>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.</p> <p><i>NOTE THAT 'AVAILABLE' DOES NOT NECESSARILY MEAN THAT THE DATA SET BECOMES OPENLY AVAILABLE, CONDITIONS FOR ACCESS AND USE MAY APPLY. AVAILABILITY IN THIS QUESTION THUS ENTAILS BOTH OPEN & RESTRICTED ACCESS. FOR MORE INFORMATION: HTTPS://WIKI.SURFNET.NL/DISPLAY/STANDARDS/INFO-EU-REPO/#INFOEU-REPO-ACCESSRIGHTS</i></p>	<p><input type="checkbox"/> Yes, in an Open Access repository</p> <p><input checked="" type="checkbox"/> [X] Yes, in a restricted access repository (after approval, institutional access only, ...)</p> <p><input checked="" type="checkbox"/> [X] No (closed access)</p> <p><input type="checkbox"/> Other, please specify:</p>
<p>If access is restricted, please specify who will be able to access the data and under what conditions.</p>	<p>People within IMEC will be able to access the data. People within IMEC include staff and associates with KU Leuven, Ghent, Antwerp, Brussels, etc. People outside IMEC will be granted access to the data on request, if approved internally by the technical staff.</p>
<p>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.</p>	<p><input type="checkbox"/> Yes, privacy aspects</p> <p><input checked="" type="checkbox"/> [X] Yes, intellectual property rights</p> <p><input type="checkbox"/> Yes, ethical aspects</p> <p><input type="checkbox"/> Yes, aspects of dual use</p> <p><input type="checkbox"/> Yes, other</p> <p><input type="checkbox"/> No</p> <p>If yes, please specify:</p>
<p>Where will the data be made available? If already known, please provide a repository per dataset or data type.</p>	<p>-</p>

<p>When will the data be made available?</p> <p><i>THIS COULD BE A SPECIFIC DATE (DD/MM/YYYY) OR AN INDICATION SUCH AS 'UPON PUBLICATION OF RESEARCH RESULTS'.</i></p>	-
<p>Which data usage licenses are you going to provide? If none, please explain why.</p> <p><i>A DATA USAGE LICENSE INDICATES WHETHER THE DATA CAN BE REUSED OR NOT AND UNDER WHAT CONDITIONS. IF NO LICENCE IS GRANTED, THE DATA ARE IN A GREY ZONE AND CANNOT BE LEGALLY REUSED. DO NOTE THAT YOU MAY ONLY RELEASE DATA UNDER A LICENCE CHOSEN BY YOURSELF IF IT DOES NOT ALREADY FALL UNDER ANOTHER LICENCE THAT MIGHT PROHIBIT THAT.</i></p> <p><i>EXAMPLE ANSWER: E.G. "DATA FROM THE PROJECT THAT CAN BE SHARED WILL BE MADE AVAILABLE UNDER A CREATIVE COMMONS ATTRIBUTION LICENSE (CC-BY 4.0), SO THAT USERS HAVE TO GIVE CREDIT TO THE ORIGINAL DATA CREATORS." ⁸</i></p>	-
<p>Do you intend to add a PID/DOI/accession number to your dataset(s)? If already available, please provide it here.</p> <p><i>INDICATE WHETHER YOU INTEND TO ADD A PERSISTENT AND UNIQUE IDENTIFIER IN ORDER TO IDENTIFY AND RETRIEVE THE DATA.</i></p>	<input type="checkbox"/> Yes <input type="checkbox"/> [X] No If yes:
<p>What are the expected costs for data sharing? How will these costs be covered?</p>	-

⁸ Source: Ghent University Generic DMP Evaluation Rubric: <https://osf.io/2z5g3/>

7. Responsibilities

Who will manage data documentation and metadata during the research project?	Adham Sakhnini
Who will manage data storage and backup during the research project?	Adham Sakhnini
Who will manage data preservation and sharing?	Adham Sakhnini
Who will update and implement this DMP?	Adham Sakhnini