

Form Data Management Plan

This form is intended for the development of a data management plan, based the data management section that formed part of your research proposal. NWO expects you to incorporate any comments received from the referees and/or the committee about the data management section in this data management plan. Please do not use any abbreviations and when referring to any website mention the complete web address.

NWO only requests storage of reusable relevant data. NWO understands 'data' to be both collected, unprocessed data as well as analysed, generated data. Under this, all forms are conceivable; digital and non-digital (for example samples, completed questionnaires, sound recordings, etc.).

For this data management plan, NWO uses a template that matches the guidelines for data management from Horizon 2020. An explanatory note can be found at the end of this document. For help with the completion of the data management plan, please contact the university library and/or ICT Department of your institute or university. If necessary, you can also contact the NWO-domain that awarded your proposal funding.

You are kindly requested to complete the plan below and submit it to NWO within four months after the awarding of funding. NWO will approve the data management plan as quickly as possible. Plans in which the data will be deposited in a national or international repository will, by definition, be approved. If necessary, NWO will call upon the help of (data) experts from your scientific discipline for the assessment. As soon as the data management plan has been approved by NWO the project can be started. The data management plan can be adjusted during the course of the research.

You should submit the completed form via the online application system [ISAAC](#). The main applicant has to submit his/her data management plan via his/her own ISAAC account. Data management plans not submitted via ISAAC will not be taken into consideration.

1	General information	
1.1	Name applicant and project number	Andrea Sciacchitano 15854
2	Description dataset	
2.1	Describe the data that will be collected/generated and which you find relevant for reuse.	The data that will be collected and generated during this research project include: CAD drawings of wind tunnel models Raw PIV images Velocity and Uncertainty fields Tecplot layouts for data visualization
2.2	Which type and format of data are these?	CAD drawings: .stp Raw PIV images: .im7, .tif Velocity and Uncertainty fields: .vc7, .dat Tecplot layouts: .lay, .lpk

2.3	For which researchers/research groups is it interesting to have these data available?	Researchers working on experimental aerodynamics and especially on Particle Image Velocimetry (PIV community)
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3 Data storage		
During the research		
3.1	What is the volume of the data and where will the data be stored?	As indicated in my VENI proposal, the amount of data that will be collected and generated during this research project (and stored as FAIR data) is between 1.5 and 2.0 TB. However, the data that is actually used for publications in research journals and conference proceeding will be around 500 Gb.
3.2	Is there currently sufficient storage capacity during the project? Is there currently sufficient backup capacity during the project? Describe how often and where backups of data will be made and who is responsible for this. If no or insufficient storage or backup capacities are available then explain how this will be taken care of.	<p>Yes</p> <p>Yes</p> <p>The data will be stored onto two different repositories:</p> <p>1) SURFdrive (https://surfdrive.surf.nl/), a personal cloud storage service which allows to store, synchronise and exchange research data safely and easily. SURFdrive complies with Dutch and European privacy legislation. The data is stored safely in the Netherlands and is never made available to third parties. The capacity of the SURFdrive data storage is 250 GB.</p> <p>2) DataverseNL (https://dataverse.nl/), a secure online environment from the 4TU.Centre for Research Data (http://researchdata.4tu.nl/en/home/) for storing, processing and sharing research data. The stored researched data are backed-up on hard disks (RAID6) daily.</p> <p>Additionally, data will be stored in external hard drives which will be backed-up weekly.</p>
3.3	Describe which facilities for your data (ICT or another type, such as refrigerators or legal expertise) are already present and which are still needed.	As part of the 4TU.Centre for Research Data, TU Delft has access to both DataverseNL and SURFdrive for data storage. External hard disks of 2 TB capacity and broadband internet connection are available at the Aerodynamics Section of the TU Delft Faculty of Aerospace Engineering.

3.4	What are the expected costs? Please specify these and state an amount that is as realistic as possible. How will these costs be covered?	The expected costs for data storage for a period of at least 15 years are 8,000 € and have been included in the project budget as direct costs.
After the research		
3.5	State in which existing repository the data will be stored and which type this is. If available mention the URL. If the data will not be stored in a repository then state how the data will be made findable, accessible and usable.	The data generated in my VENI will be archived at 4TU.Centre for Research Data, a repository for technical-scientific research data located at the Library of TU Delft. It will be open access through the data repository, as long as privacy and IP requirements of the project partners (namely LaVision GmbH and DNW) are not infringed.
3.6	For how long can the data and (if applicable) the associated software be stored at most?	The database will be stored for a minimum of 15 years.
3.7	Describe which facilities for your data and any associated software are already present and which are still needed.	The software needed for making use of the data are already present in the Aerodynamics Section of the TU Delft Aerospace Engineering Faculty and are: <ul style="list-style-type: none"> - Solidworks (for .stp files) - LaVision DaVis (for .im7 and vc7 files) - Tecplot (for .lay and .lpk files) - Text editors as Notepad or Wordpad (for .dat files) - Matlab for visualizing and processing the raw images (.tif files)
3.8	What are the expected costs? Please specify these and state an amount that is as realistic as possible. How will the costs be covered?	The cost for data storage and archive for 15 years is approximately 8,000 € and has been included in the VENI budget as direct cost.

4 Standards and Metadata

4.1	Will a standard be used for the metadata? If yes, describe in detail which, and state in which databases these will be included. If no, state in detail which metadata will be made to make the data easy/easier to trace	Yes The standard descriptive metadata of the 4TU.Centre for Research Data will be used, which provides information on creator, title, contributor, publisher, publication year, date created, description, subject, temporal coverage, spatial coverage, identifier, language, link to publication. Further
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and make available for reuse. Mention the data-base in which these metadata will be included.

information on such metadata standard are available at <http://researchdata.4tu.nl/en/publishing-research/uploading-data/>. The metadata standard will be applied to all data stored on DataverseNL.

5 Making data available

5.1	<p>Are the data, or a part of these, available for reuse after the Open Access project?</p> <p>If so, please describe in a concrete manner when and how the data will be made available.</p> <p>If not, please explain why the data are not suitable and/or available for reuse.</p>	<p>Yes</p> <p>All research data that is published in the data archive will receive a Digital Object Identifier (DOI). This identifier defines a persistent link so that the research data can be cited by others. Furthermore, the DOI's of the scientific publications and of the data will be interlinked, so that the researchers who will read my publications can easily find the data associated with those.</p> <p>Additionally, published data deposits are also visible to search engines such as Google, so to help maximising visibility and impact.</p>
5.2	<p>If data are only made available after a certain period then please state the reason for this.</p> <p>If part of the data cannot be made (directly) available then please state the part concerned.</p>	<p>Data will be made available when the scientific research is published in scientific journals or conference proceedings.</p>
5.3	<p>Are there any conditions for the reuse of the data?</p> <p>If so, are these conditions defined in a consortium agreement?</p>	<p>In principle, data is available to third parties for reuse, as long as privacy and IP requirements of the project partners (namely LaVision GmbH and DNW) are not infringed. This aspect will be tackled on a case by case basis before the data is published.</p>

Explanatory note for this form

Sometimes it is simpler and cheaper to regenerate exactly the same data than to store the existing data. In some cases, regenerating data will be less privacy-sensitive than storing it. These can be acceptable reasons for not archiving this type of data for the long-term. The RDNL checklist provides a guideline for selecting the data that can be eligible for archiving.

1 Algemene informatie

Fill in the name of the project leader and the project number allocated by NWO.

2 Omschrijving dataset

- 2.1 Describe the data and documents that will be archived after the research and will be made available for reuse. State whether these data lie at the basis of publications. Which documentation will be archived that is important for making reuse of the data possible, such as methodology (codebooks, metadata) or persons involved (study subjects, researchers)?
- 2.2 Which type and format data will be stored? NWO understands 'data' to be both collected, unprocessed data as well as analysed, generated data. This can be in all (combinations of) conceivable formats; digital and non-digital (for example samples, completed questionnaires, sound recordings, etc.).

3 Data storage During the research

- 3.1 Make a realistic estimation of the final volume of the data that will be archived and the necessary storage capacity and state where you plan to store the data during the research. In the case of digital data, NWO prefers data to be stored during the research in the central storage centre of your institution, for example the ICT department and/or the university library.
- 3.2 It is important that there is storage capacity, and in the case of digital data, also a backup of your data. An automatic backup by the ICT Department is safer than a manual backup. Storage of data on laptops, hard disks or external media is in general risky and will therefore, in principle, not be accepted by NWO. If external services are used then you must ensure that no conflicts of interest arise with the policy of research partners or co-financiers and with the policy of your department or institute, for example about the security of sensitive data. Take into account the security of data; these can be physical measures (for example, a burglar alarm and a safe for the storage of data) or logical access checks (such as passwords, pin codes, passes and biometric characteristics).
- 3.3 Describe which facilities are already present for your data and which are still needed. In the case of ICT, think about data storage capacity, bandwidth for data transport and calculation power for data processing. The ICT department, the university library or research support service at your institution can help you to draw up this description.

- 3.4 Make a realistic estimation of the costs that will be made and state an amount that is as realistic as possible. Important factors that determine the costs are:
- the type of data;
 - the capacity needed for storage and backup;
 - the amount of manual work for allocating metadata and drawing up other documentation such as code books and queries used in the statistical package;
 - the extent to which the data needs to be made secure;
 - the hiring of external data management and other expertise.

After the research

The data should preferably be stored for the long term in a national or international data repository. If this is not possible then the data should be stored by the institutional repository. Contact the intended data repository or archive in good time about the available file formats and necessary metadata, for example.

- 3.5 International guidelines are available for the sustainable storage of data. Of these, the international Data Seal of Approval has the simplest set of criteria. State at which existing repository the data will be stored and what type this is (for example an institutional repository or a standard repository in your discipline). Trusted Digital Repositories with a quality mark include repositories with a Data Seal of Approval, DIN-31644-, ISO- 16363- or WDS/ICSU certification. An overview of existing repositories with Data Seal of Approval can be found in this [list of repositories](#).

According to the Netherlands Code of Conduct for Scientific Practice, raw data must be stored for a period of at least 10 years. A longer period is certainly recommended.

- 3.6 Make use of sustainable software to make reuse possible. When doing this consider the following points:
- Work with preferred file formats that are not limited to specific software, e.g. CSV for spreadsheets.
 - Carefully document which version of which software the data have been produced in; just as the exact settings of equipment in some disciplines.
 - Use of software standardly used within the discipline.
 - Document the exact syntax queries in the case of statistics software, for example.
- 3.7 Describe which facilities (ICT or another type such as refrigerators or legal expertise) are already present for your data and which are still needed. In the case of ICT think about data storage capacity, bandwidth for data transport and calculation power for data processing. The ICT department, the university library or research support service at your institution can help you to draw up this description.

4 Standards and metadata

To make data findable and readable in the future and to be able to interpret it the data collection must be provided with descriptive information in the form of metadata. The most widely used standards can be compared with each other, such as the standardised metadata of the Dublin Core standard, SNOMED CT and the Data Documentation Initiative.

5 Beschikbaar stellen van data

For data to be shared with third parties it is important that the necessary software or other tools needed are available for reuse. In addition it is advisable to determine which conditions a research group that wants to obtain access to your data must satisfy. Examples of this are agreements that will be made concerning methodology, publications, the access period, availability of data, the costs (handling fee), copyright aspects, etc.

- 5.3 State whether embargoes, licences, commercial objectives or other conditions have been imposed on the reuse of the data. If applicable: have these been recorded in a consortium agreement?