

FEASIBILITY ANALYSIS OF INNOVATIVE PRACTICES IN VIRTUAL TESTING METHODS FOR AIRCRAFT CERTIFICATION

Project: FAVIT

Grant Agreement nº: 864475

D5.3. Data Management Plan

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This project has received funding from the Clean Sky 2 Joint Undertaking (JU) under grant agreement No 864475.
The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Clean Sky 2 JU members other than the Union.

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1 INTRODUCTION

The content of this document is built upon the data coming from the knowledge-based proposals proposed by ORBITAL for the improvement of aerospace standards and guidelines for the system suppliers and aircraft manufacturers.

The main goal of the FAVIT Data Management Plan (DMP) is to offer a global view of this information and data arisen before, during and after the execution of the project and to provide an analysis of the main elements of the data management policy that will be used by the applicant with regard to all the datasets that will be generated by the project. The procedures for handling this data will be described also in this document, as well as, the methodologies and standards used during data collection and handling, and the elaboration of procedures for sharing and open access to the FAVIT data and for curation and preservation of the data.

Besides, the FAVIT DMP will establish the procedure for data collection, consent procedure, storage, protection, retention and destruction of data, and confirmation that they comply with national and EU legislation. This DMP aims at providing an effective framework to ensure comprehensive collecting and handling of the data used in the project. Also, this document will give norms for the secure exchanging of the arisen data between entities following the internal data protection strategies. Thereby and wherever trade secrets of the participating companies and industries are not violated, FAVIT strives to comply with the open access policy of Horizon 2020.

The DMP is a document subject to change during the execution of the whole project. So, it will be adapted to the needs of FAVIT at any time throughout the project's runtime.

This plan will consider different measures in order to set the procedures for the sharing of data during the lifecycle of the FAVIT's project. For satisfying the principles for research data (FAIR DATA) such as:

- Make data easy to find
- Data Accessible
- Interoperable
- Re-usable

These measures are the following:

- Data set reference and name: satisfies the principles Accessible and findable.
- Data set description: satisfies the principles Accessible and findable.
- Standards and metadata: satisfies the principles accessible and findable.
- Data sharing and handling during and after the end of the project: satisfies the principles interoperable and re-usable.
- Archiving and preservation (including after the end of the project): satisfies the principle re-usable.

In this sense all the publications arising from this project will be made freely and openly available via an online repository. The objectives of using open access publishing are to accelerate further research, to enrich the knowledge of the general public and to improve

education by giving access to teachers and learners to the latest research findings around the world.

The following document made use of the HORIZON 2020 FAIR DATA MANAGEMENT PLAN TEMPLATE and was written with reference to the Guidelines to FAIR data management in Horizon 2020 and the GDPR (Regulation (EU) 2016/679).

2 FAVIT DATA SUMMARY

FAVIT main objective is to deliver a set of knowledge-based proposals for the improvement of aerospace standards and guidelines for the system suppliers and aircraft manufacturers. FAVIT will analyse the current aerospace standards and guidelines to identify how the design and verification processes can be enhanced to accelerate the processes using the state-of-the-art technologies based in virtual testing.

Seeking that purpose, the existing European certification and standards used at aircraft certification will be analysed, studying the guidelines provided by the standardization groups and certification authorities. Main regulations come from the European Agency EASA (European Aviation Safety Agency) and the American agency FAA (Federal Aviation Administration).

This assessment of aerospace standards will be done firstly by bibliographic revision to analyse existing European certification processes and rulemaking to point out potential shortcomings and bottlenecks; and secondly through 5 real case studies in certification processes. These real case studies will be based on 3 certification processes from previous ORBITAL experience and 2 applications from a selected stakeholder (e.g. Airbus).

FAVIT project will identify gaps in standards and will define guidelines for the optimisation of the benefits of virtual testing methods, including demonstrators, for aerospace applications. Open consultation will be used to disseminate information about the objective of the FAVIT project, and to engage the stakeholder to contribute to the results of the project and to participate in the working groups. A specific questionnaire will be designed together with a set of indicators that will permit to quantify the quality of the solutions and compare them.

Besides thanks to the survey conducted in the Open Consultation, information about the most relevant tools and technologies used currently or planned related to virtual testing will be gathered. The information collected of the interviews will help later demonstrate the benefits or virtual testing methods.

The objective of FAVIT project is to develop a methodology and a guide for best practices for virtual testing oriented to enhance certification process for system suppliers and aircraft manufacturers. The results of the FAVIT project will provide evidences and support guidelines to permit the developers to go up to operation level in a medium term.

All the information used for achieving this objective will be classified in data sets depending on the nature of this information (figure 1).

In addition to classification according to nature, data can be classified as open and non-open. The characteristics that the open data meets are:

- Availability and access: Data must be available as a whole.
- Reuse and redistribution: Data must be provided under terms that allow reuse and redistribution.
- Universal Participation: Anyone should be able to use, reuse and redistribute information.

The non-open data are the protected data, which is not accessible to anyone.

More details information is added in section 3.3.1.

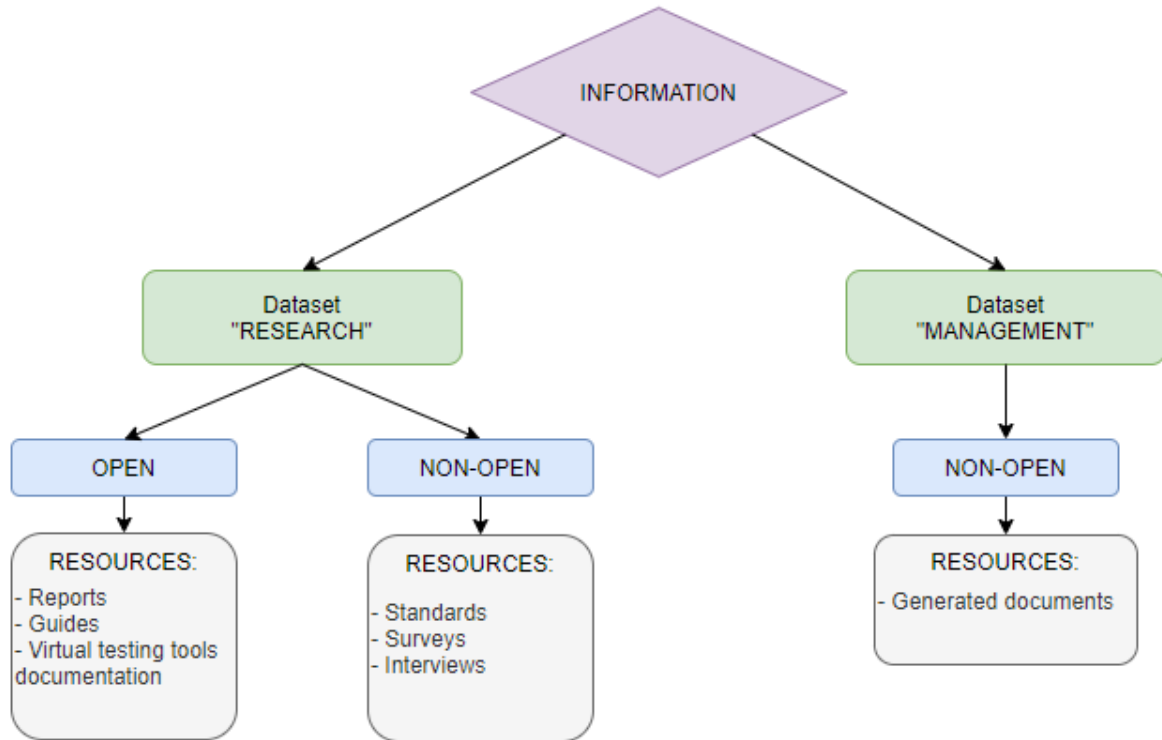


Figure 1 Datasets

The research dataset collects all the information related to the investigation process:

- Reports: generated documents resulting of the investigation.
- Guides: current aerospace guidelines.
- Virtual testing tools documentation:
- Standards: current aerospace standards.
- Surveys: information about the most relevant tools and technologies used currently or planned related to virtual testing will be gathered.
- Interviews: Virtual tool suppliers (an initial estimation of 8 in 4 countries) will be interviewed about their solutions.

The management dataset, however, collects the information resulting of this investigation:

- Documents: generated documents resulting of the management processes.

3 FAIR DATA

This DMP includes for each data set collected, processed and/or generated in the project the following elements: reference and name, description, standards and metadata, data sharing and handling, archiving and preservation. This is in line with the EU's guidelines and with the interest in a broad dissemination of the results of this project with the big objective of contributing to improve EU aerospace industry competitiveness.

The named characteristics are described in detail in this section in order to ensure their understanding by the collaboration working groups, aircraft manufacturing and certification industry.

3.1 DATA SET REFERENCE, NAME AND DESCRIPTION

All data sets shall be findable, distinguishable and easily identifiable. In order to accomplish it, each data set will be assigned a unique name. Besides, this name will be used as identifier and will provide information on the nature and purpose.

The deliverables will follow the coding specified in D5.2. Project Management Handbook and the codification of the other files in the project will include the data specified in the table below:

File Identification		File		Version Number
Letter Code	Numeric Code	File Name	File Acronym	
SUR	1.	Interview Stakeholder1	N/A	_v1

Example of file identification: SUR1.Interview Stakeholder1_v1

- A letter code depending on nature of the file:
 - "DOC" for generic documents.
 - "RPT" for reports.
 - "INV" for information and investigation documents such as virtual tools documentation, guidelines...
 - "STD" for standards.
 - "SUR" for surveys and interviews.
 - "PLN" for plans.
- A numeric code according to the WP it belongs, it will be a number between 1 and 5.
- The file name, which shall describe it briefly.
- The Acronym of the file (if applicable) in parenthesis.
- The version number.

Every collected, processed or generated data set will have a brief description.

3.2 STANDARDS AND METADATA

At this point of the project it's not possible to include a compilation of all the metadata being collected and generated in FAVIT project.

The following formats of data are predicted to be used:

- Microsoft Office for documents .doc, .docx, .xls, .xlsx, .ppt, .pptx. The final version of the documents, finished and approved, will also be published as .pdf.
- When needed, it will be used .csv and .txt file formats.
- Enterprise Architect for vector graphics. (Format: .svg), and will be made available as .png, .jpg and .pdf files.
- MP3 or WAV for audio files.
- Quicktime Movie or Windows Media Video for video files.

ORBITAL will ensure open access (free of charge online access for any user) to all peer-reviewed scientific publications relating to its results. The bibliographic metadata must be in a standard format and must include all of the following:

- the terms “Clean Sky 2 Joint Undertaking”, “European Union (EU)” and “Horizon 2020”;
- the name of the action, acronym and grant number;
- the publication date, and length of embargo period if applicable, and
- a persistent identifier.

As an exception and as stated in Article 29.3 of the Grant Agreement, we will not ensure open access to the following specific parts of the research: surveys, interviews. With the aim of guaranteeing reaching as much stakeholder as possible and therefore, guaranteeing the fulfillment of the project objective, there will not be open access to these particular data.

The different data sets will comply Open Archives Initiative metadata protocol and fulfil Zenodo requirements to ensure compatibility with international standards. Files will be converted to open file formats before long-term storage is made and comprised when necessary.

Also, each data base will have defined the necessary keywords in order to make the data sets re-usable such as: critical systems, aerospace, modelling, simulation, design, design optimization, certification, safety and virtual testing.

3.3 DATA SHARING, ACCESS AND PRESERVATION

The data generated by FAVIT will be properly shared and preserved once processing, quality control, organisation and analysis on the sharing policies attached to it is made. The WP5 working group will discuss when the data can be openly accessible on a case by case basis. Ethical aspects, data security, including intellectual property requirements, will be considered. If there is any data set created that needs to be partially or totally withheld, legal and contractual reasons will be explained. This will be decided in consultation with the relevant collaborators.

3.3.1 Non-Open research data

The reasons why data may not be openly shared are:

- third parties data obtained with permission, but they have not agreed to make the data publicly available,
- data that discloses the identity of a manufacturer,
- data that compromises the protection of a collaborator intellectual property,
- and market or customer survey data, which are commercially sensitive and cannot be shared.

ORBITAL will archive and preserve the non-open research data in its own storage systems, Sharepoint. They have limited access by internal registered users. Pre-processed data will also be archived in ORBITAL storage systems and not be provided unless there is a clear reason for doing so.

3.3.2 Open research data

The open research data will be organised and deposited in FAVIT and ORBITAL websites repositories. The information will be also archived in the initiative from open data sharing from research repositories Zenodo (operated by FP7 project OpenAire and OpenDOAR (<http://www.opendoar.org/>)). The repositories have well described conditions for access, including users registration.

The articles documenting the key project innovations that ORBITAL aims to publish will be deposited in European open access databases such as HAL (hal.archives-ouvertes.fr) and institutional repositories such as Invenia Repository for Technological Innovation (invenia.es).

4 ALLOCATION OF RESOURCES

Data management in FAVIT will be done as part of the WP5 and ORBITAL, as project coordinator, will be responsible for data management in FAVIT project. The costs for making the data FAIR are included in the project's budget. In that respect, Person months have been considered to carry out this task. Besides, part of the overall budget has been allocated for open access publications.

The WP5 work group will have overall responsibility for data management. There will be a leader who will lead this working group and will be responsible for coordinating updates to the data management plan. The working group will be responsible for organising data backup and storage, data archiving and for depositing the data within the repositories (Zenodo).

5 DATA SECURITY

The project data will be stored in the storage system of ORBITAL. ORBITAL will be responsible for ensuring that data is stored securely (firewall, backups etc) and in full compliance with the data protection laws of the European Union.

After the completion of the project, all responsibilities related to data recovery and secure storage will go to the repository that stores the data set.

All data files will be transferred through secure connections and in an encrypted and password protected form (for example, the centralized open access repository such as Zenodo (operated by the FP7 OpenAire project) or with the 7-zip open source tool provided by Full AES-256 encryption: <http://www.7-zip.org/>). Passwords will not be exchanged by email, but in personal communication between partners.

Zenodo provides a secure and trusty way of storing data that will be retained for the lifetime of the repository. Besides, deposition in the Zenodo public repository will provide:

- Additional security: all data files are stored in CERN Data Centres, primarily Geneva, with replicas in Budapest. Data files are kept in multiple replicas in a distributed file system which is backed up every night.
- Fixity and authenticity: All data files are stored along with a MD5 checksum of the file content. Files are regularly checked against their checksums to assure that file content remains constant.
- File preservation: Data files and metadata are backed up nightly and replicated into multiple copies in the online system.

6 ETHICAL ASPECTS

This section considers the ethical and legal compliance aspects, like the consent for data preservation and sharing.

ORBITAL, in accordance with the Topic Manager, will determine the results and knowledge arising from the project that will be made available to the public through public reports and/or journal publications and conferences. The strategy for knowledge management and protection of project data will include measures to provide open access (free on-line access, such as the 'green' or 'gold' model) to peer-reviewed scientific publications which might result from FAVIT.

ORBITAL is, therefore, fully aware of the open access to scientific publications article as stated in the Article 29.2 of the H2020 Grant Agreement (GA). A secured collaborative space (i.e. the intranet of the website) will be set up for internal communication and document sharing. As required under Horizon 2020, open Access (OA) to all peer-reviewed scientific publications and supporting data stemming from work done in this project will be ensured, as long as it is not in conflict with the protection of personal information collected during the project (section 5). This will be done following the GA Article 29.3 of the model grant agreement, and via channels such as:

- A public document repository on the project website
- Available repositories on the websites of ORBITAL
- Centralised open access repository such as Zenodo (operated by FP7 project OpenAire), ROAR (<http://roar.eprints.org/>) and OpenDOAR (http://www.open_doar.org/).

In the case of publishing via “hybrid journals”, the applicable Author processing charges (APCs) to ensure “gold open access” will be covered by the publishing institutions. Moreover, all the presentation materials, for which this is appropriate, will be published on the project’s web site under a Creative Commons licence <http://creativecommons.org>.

FAVIT has to comply with the ethical principles as set out in Article 34 of the Grant Agreement, which states that all activities must be carried out in compliance with:

- ethical principles (including the highest standards of research integrity — as set out, for instance, in the European Code of Conduct for Research Integrity including, in particular, avoiding fabrication, falsification, plagiarism or another research misconduct) and
- applicable international, EU and national law (in particular, EU Directive 95/46/EC).

All information will be reviewed by our legal department and is not expected to have any ethical or legal impact.

6.1 INFORMED CONSENT

An Informed Consent Form will be handed out to any individual participating in FAVIT interviews or other activities which may lead to the collection of data which will subsequently be used in the project. An information clause on data protection is included in the surveys to be carried out. These surveys will be guarded for preserver protection of their content and the protection of the participant's data.

An example of informed consent form is shown in the Annex of the present document.

6.2 INVOLVEMENT OF NON-EU COUNTRIES

In case non-EU partners exist, the ethical standards and guidelines of Horizon2020 will be rigorously applied, regardless of the country in which the research is carried out. Activities carried out outside the EU will be executed in compliance with the legal obligations in the country where they are carried out, with an extra condition that the activities must also be allowed in at least one EU Member State.

In FAVIT, when an exchanging the data is necessary, within or outside the EU, the transfer will only made in encrypted form via secured channels.

6.3 MANAGEMENT OF ETHICAL ISSUES

Personal data which will be collected within this project, will only be stored, analysed and used anonymously. The individuals will be informed comprehensively about the intent use of the information collected from them and have to agree to the data collection for this scientific purpose with their active approval in form of a written consent.

The identity of any individual interviewed or other wisely engaged in the project (e.g. by email correspondence) will be protected by this anonymization of the data. The anonymization process guarantees that no particular individual can be identified anymore. Statistics and tables of quantitative research will be published in a manner such that it will not be possible to identify any person.

This project will guarantee that this process, including the information of the individuals about data protection issues, fully complies with national and EU laws.

7 TIMETABLE FOR UPDATES AND KEY DATES

This is a live document susceptible to changes originated by meetings or other events during the execution of the project. The key dates when these changes could arise and could lead in an update of the document are the following:

Events	Month	Dates	City	Participants
Meeting Eurocopter	M5	February 2020	Ottobrunn	Eurocopter
Meeting ADS	M9	June 2020	Getafe	ADS

8 ANNEX I: INFORMATION CONSENT EXAMPLE



Project Acronym	FAVIT
Project Title	FEASIBILITY ANALYSIS OF INNOVATIVE PRACTICES IN VIRTUAL TESTING METHODS FOR AIRCRAFT CERTIFICATION
Project Coordinator	Orbital Critical Systems Name: David Garcia
Project Duration	01/10/2019- 31/03/2022

Introduction

Before making a decision on whether you want to participate or not, please read this document carefully. Please feel free to ask any questions to ensure that you fully understand the purpose and proceedings of this open consultation/interview, including risks and benefits.

Compliance with legal and ethical regulations

We assure full compliance with relevant legislation on data protection and ethical standards.

Purpose of the study

You have been invited to take part in a study for the implementation of the project FAVIT-“FEASIBILITY ANALYSIS OF INNOVATIVE PRACTICES IN VIRTUAL TESTING METHODS FOR AIRCRAFT CERTIFICATION”, project funded by Clean Sky 2 Joint Undertaking (JU) under call topic JTI-CS2-2018-CfP09-SYS-03-22 (Virtual Testing Based Certification), grant agreement No 864475. The JU receives support from the European Union’s Horizon 2020 research and innovation programme and the Clean Sky 2 JU members other than the Union.

The start of the project was 01/10/2019, with a duration of 30 months, until 31/03/2022. The project is led by Orbital Critical Systems (ORBITAL), being the only partner participating in the project.

FAVIT main objective is to deliver a set of knowledge-based proposals for the improvement of aerospace standards and guidelines for the system suppliers and aircraft manufacturers. FAVIT will analyse the current aerospace standards and guidelines to identify how the design and verification processes can be enhanced to accelerate the processes using the state-of-the-art technologies based in virtual testing.

Involvement

If you agree to participate in the open consultation/interview, you will be asked to answer a questionnaire / participate in an interview carried out as part of Work Package 1 and Work Package 2 of the project. The content has been produced by ORBITAL. The questionnaire / interview and will provide ORBITAL with information on the current status of the market and their necessities and the use of virtual testing.

We inform you that the interview in which you may participate may be photographed. ORBITAL may be entitled to publish these images in its Website and social networks.

Benefits

Your participation in this open consultation/interview will contribute to develop methodology and a guide for best practices for virtual testing oriented to enhance certification process for system suppliers and aircraft manufacturers.

Risks

There are no foreseeable risks involved in participating in this open consultation other than those encountered in day-to-day life.

Online data being hacked or intercepted: anytime you share information online there are risks. We're using a secure system to collect this data.

Privacy and confidentiality

The results of this study will be published but this publication will not contain any information that could identify you.

Voluntary nature of the study

Participation in this open consultation/interview is completely voluntary.

CONTACT

If you have questions at any time about the study or procedures, you may contact the Project Coordinator.

If you feel you have not been treated according to the descriptions in this form, or that your rights as a participant in research have not been honoured during the course of this project, or you have any questions, concerns, or complaints that you wish to address, you may contact ORBITAL.

Voluntary Consent

By signing this consent form, you are agreeing that you read, and you fully understand the contents of this document and are willing to take part in this open consultation/interview. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate in this study.

I agree to participate in the open consultation/interview

This consent form is made pursuant to the relevant national, European and international data protection laws and regulations and personal data treatment obligations. Specifically, this consent document complies with the General Data Protection Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC.

.....
Name and surname of participant

.....
Place, date and signature of participant

Statement of investigator's / interviewer's responsibility: I have explained the nature and purpose of this study, the procedures to be undertaken and any risks that may be involved. I have offered to answer any questions and fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent.

.....
Name and surname of the researcher

.....
Place, date and signature of the researcher



The purpose of the study is related to the objectives of the project "FAVIT". This project has received funding from the Clean Sky 2 Joint Undertaking (JU) under grant agreement No 864475. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Clean Sky 2 JU members other than the Union.