

DATA MANAGEMENT PLAN

MORAL
Grant No. 870365

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Abstract

This document presents the data management plan of the MORAL project. It should serve as a guideline to the project partners regarding the data management policy. It describes the access of scientific publications and research data as well as the handling, storage, archiving and sharing of data.

¹ Dissemination level: **PU** = Public; **PP** = Restricted to other programme participants (including the Commission Services); **RE** = Restricted to a group specified by the consortium (including the Commission Services); **CO** = Confidential, only for members of the consortium (including the Commission Services).

² Nature of deliverable: **R** = Report; **P** = Prototype; **D** = Demonstrator; **O** = Other

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List of Acronyms

ACRONYM	MEANING
ADC	Analog-to-Digital Converter
ASIC	Application-Specific Integrated Circuit
BSCW	Basic Support for Cooperative Work
CPU	Central Processing Unit
DAC	Digital-to-Analog Converter
DMP	Data Management Plan
DMP	Data Management Plan
DOA	Description of Action
DSP	Digital Signal Processing
EC	European Commission
ECSS	European Cooperation for Space Standardization
ESA	European Space Agency
ESCC	European Space Components Coordination
GDPR	General Data Protection Regulation
IEEE	Institute of Electrical and Electronics Engineers
ITAR	International Traffic in Arms Regulations
NewEuCo	New European Company
OEM	Original Equipment Manufacturer
PCB	Printed Circuit Board
PM	Person Month
PO	Project Officer
TRL	Technology Readiness Level
WP	Work Package

Table 1: List of acronyms

Executive Summary

This document is the Data Management Plan (DMP) of the MORAL project. Its purpose is to describe the data management policy in respect to the research data and scientific publications generated in the project. The DMP also describes the handling, storage, archiving and sharing of research data between partners. This document may be subject to changes. The DMP may be changed according to the needs of the MORAL project during its lifetime.

1 Introduction

Recently, low-cost small satellites came in the focus. Space agencies have demonstrated their potential for scientific research and practical applications in the fields of Earth Observation, Science Mission, Human Spaceflight, Space Transportation, Telecommunications, Navigation, Space Security, Robotic Exploration, Unmanned Aircraft Systems (UAS), Defense Applications, etc. The availability of low-cost small satellites is an important issue for various scientific and commercial projects. The recognized potential how they could revolutionize space science, experimentation and operational use, empowers small satellites to be part of a strong business future in space applications. In such a scenario with exponential growth, we can observe that today's small satellites are mainly powered by traditional electronics, increasing new capabilities, but reducing the reliability of such systems compared to traditional missions.

The two main objectives of the MORAL project are the following.

- To develop a completely European, International Traffic in Arms Regulations (ITAR) free, high performance, 32-bit microcontroller for space applications. The processor core is based on a novel PEAKTOP architecture, including novel, European instruction set. Besides the processor, the required ITAR-free middleware, Real-Time Separation Kernel (RTSK) and software toolchain will also be available. Achievement of Technology Readiness Level (TRL) 6 is planned.
- To establish a new European company held by the two core partners involved in this project, which will target the European market, but also Russia, India, China and Latin America. This new company, as the last stage of the evolution of the project, will sell the microcontroller chip and its accompanying software, and give support to the market. It will be focused to produce a microcontroller that can bootstrap the European market for space applications. In particular, it targets the fast growing small satellite market.

The MORAL consortium consists of five partners:

- Institut fuer Halbleiterphysik (IHP) Germany – Coordinator
- RedCat Devices (RCD) Italy
- SYSGO, Germany
- Thales Alenia Space – Espana (TAS-E), Spain
- AbsInt – Angewandte Informatik, Germany

2 Data Management Plan

The Guidelines on Data Management in Horizon 2020 [1] requires information on

- the handling of research data during and after the end of the project
- what data will be collected, processed and/or generated
- which methodology and standards will be applied
- whether data will be shared/made open access and
- how data will be curated and preserved (including after the end of the project).

2.1 Open access to scientific publications

The project partners consider that open access to scientific publications with public funding is beneficial for the society. In Horizon 2020 projects, each beneficiary is obliged to ensure open access to all peer-reviewed scientific publications generated by the project (see Article 29.2 of the Model Grant Agreement). The open access does not imply obligations of publishing, but if a publication is chosen as a dissemination channel then open access has to be provided. Partners can choose freely how the open access will be provided, i.e., one of the following two types:

- **Green open access** (self-archiving), in which published articles or manuscripts are archived in an online repository. In this type of access, partners have to ensure open access within six months.
- **Gold open access** in which the articles or manuscripts are immediately made open by the publisher or journal website. Publishers of open access articles usually charge the authors (i.e., author's organizations or companies). These costs are eligible for reimbursement during the project lifespan. Open access in this type has to be granted at the latest on the date of publication and a copy should be put in the repository.

The project consortium encourages project partners to publish using the **gold open access** whenever possible. However, if this is not possible, the **green open access** will be used as a minimum. Partners will provide open access to scientific publications on the MORAL project website and/or alternatively on the partner's websites. In all scientific publications that are generated by the project the following acknowledgement shall be put:

"This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 870365 (MORAL)"

The partner repositories will ensure maximal visibility and long-term preservation of the articles. For example, IHP has an internal system for publishing which assures automatically updating the online, public repository of green open access publications and linking to gold open access publications, which is of course free of charge and easily accessible. This updating is done as soon as possible, but not later than six months (as required by the green open access).

2.2 Access to research data

The Guidelines on Data Management [1] require sharing (i.e., open access) of research data in a manner that maximizes opportunities for the future research. Open access to research data refers to the right to access and re-use digital research data generated by the project.

However, as said in the Introduction Section, one of the goals of the MORAL project is commercialization of the chip. Open access to research data can significantly reduce the comparative advantages of the technology to other competitors. Therefore, the partners of the MORAL project agreed not to provide open access to any of the research data and classify all data as confidential. Nevertheless, the partners may later decide (even after project completion) that open access to selected data is provided.

2.3 Data handling, storage and archiving

Project partners are legally obliged to carefully and systematically preserve data as a rule of good research praxis. For example, IHP has to keep data at least 10 years in appropriate folders which is archived at the end of the project. Furthermore, version control is applied on source and design files. The design data and the accompanying documentation are also stored and archived in convenient way in order to enable easy reproduction of results. However, these processes are part of the internal quality management of each organization.

RCD has an internal content management repository based on Lotus Notes where key data related to both technical and administrative issues are stored (see Figure 1). The tool is based on a simple workflow according to ISO9000 rules where a composer is the owner of the document (mainly a repository of attached files) and responsible of the life-cycle of the document itself: from the creation to the archiving. E-mails are sent to colleagues in the mailing list when new release of the document is generated. RCD content management tool is only internal and not shared with external users.

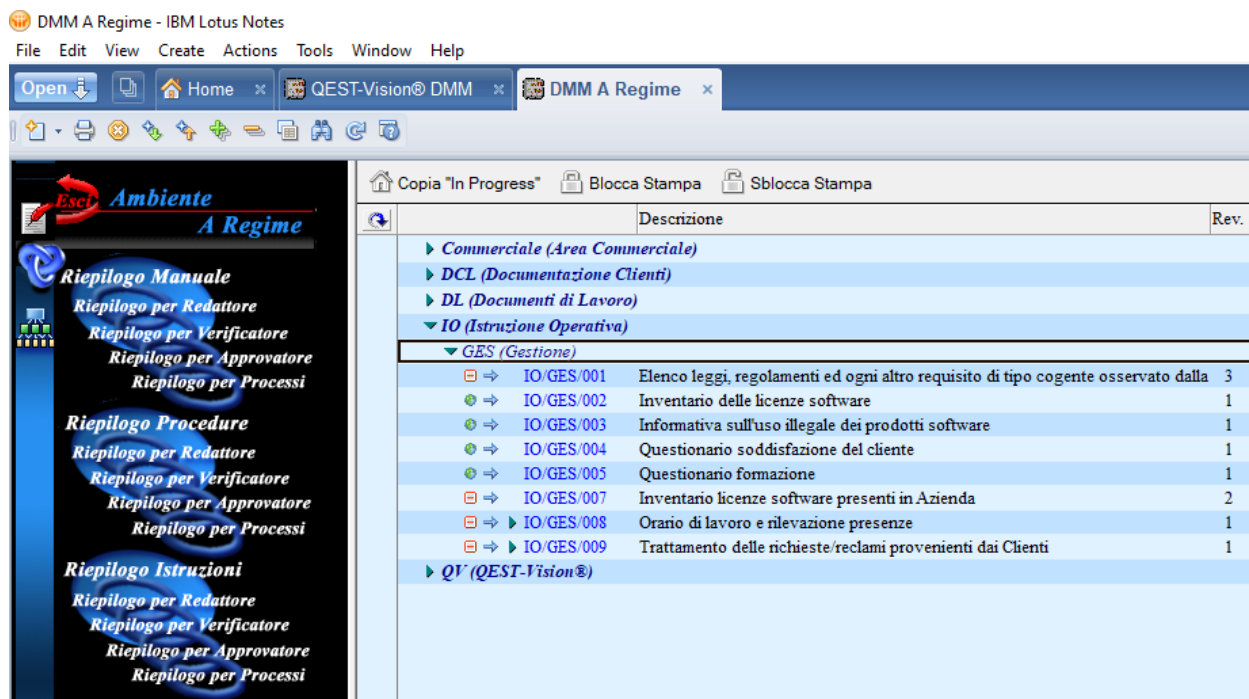


Figure 1: RCD content management repository based on Lotus Notes

Software developed by AbsInt for the MORAL project will be managed in an internal revision control system for the source code (Git) and regularly saved on our backup system. During the project, the software will be shared with project partners. At some point in the future the developed software will be publicly accessible on GitHub (CompCert) or in case of the binary utilities either contributed to the GNU project for integration into their official distribution or also published on GitHub.

2.4 Data sharing between partners

Data between consortium partners is shared exclusively by a protected type of communications, e.g., the Basic Support for Cooperative Work (BSCW) system, which allows secure access only to invited users. However, data which is not large is also shared over standard E-mail messages.

3 Summary

The MORAL project DMP encourages golden open access, but at least green way access to scientific publications. On the other side, the project consortium decided to keep the entire access to research data closed, which is exchanged between project partners in a secure way. The partners in the project are obliged to systematically preserve data as a part of their internal quality management processes.

This document may be subject to changes, i.e., the DMP it may be adjusted according to the project requirements during project execution.

References

- [1] EC Guidelines on FAIR Data Management in Horizon 2020, v3.0, 26.07.2016