



Enabling safe & secure modular UPdates, UPgrades and DynAmic Task reallocation and Execution for Software Defined Vehicles

D7.2. Data Management Plan V1.1

DEUTSCHES ZENTRUM FÜR LUFT - UND RAUMFAHRT EV (DLR)

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Executive Summary

The Data Management Plan (DMP) addresses ethical considerations, data protection, security measures, and legal compliance to provide a comprehensive framework that ensures that all project data is managed according to best practices of a Horizon Europe research and innovation action (RIA). It outlines an approach to manage data throughout the entire project lifecycle, from generation/collection to post-project handling, and it balances scientific openness with necessary protections for intellectual property and collaborative efficiency, positioning the consortium for both immediate project success and long-term research impact. For that, the document is designed to be a living document, regularly updated to adapt to the project developments

Acronyms and Abbreviations

Abbrev.	Full Name
AD	Autonomous-Driving
CA	Consortium Agreement
CAD	Connected and Automated Driving
CCAM	Connected Cooperative and Automated Mobility
CoCo	Coordinator Contact
COTS	Commercial Off-The-Shelf
CSA	Coordination and Support Action
D	Deliverable
Diss/Expl	Dissemination/Exploitation
DoA	Description of Action
DPC	Data Privacy Coordinator
EC	European Commission
ECU	Electronic Control Unit
EU	European Union
FSIGN	Financial Signatory
GA	Grant Agreement
HAL	Hardware Abstraction Layer
HW	Hardware
IP	Intellectual Property
JU	Joint Undertaking
LEAR	Legal Entity Appointed Representative
LSIGN	Legal Signatory (LSIGN)
M	Month
MBE	Model-Based Engineering
MBSE	Model-Based System Engineering
NDA	Non-Disclosure Agreement
NFA	National Funding Authorities
OAL	OS/MW Abstraction Layer
ODDs	Operational Design Domains
ORP	Orchestration and Reconfiguration Plane
PaCo	Participant Contact
PC	Project Coordinator
PCoCo	Primary Coordinator Contact
PGA	Project General Assembly
PPR	Periodic Project Report
PU	Public
R	Report
SASE	SAfety and SEcurity
SD-CCAM-V	Software-Defined CCAM vehicles
SDV	Software Defined Vehicle

SEN	Sensitive
SoM	System-on-Module
SOTA	Software-Over-The-Air
SW	Software
SyGMA	System Grant Management https://ec.europa.eu/research/participants/grants-app/reporting/DLV-101203060
TL	Task Leader
TSN	Time Sensitive Network
UCL	Use Case Leader
V&V	Verification and validation
V2C	Vehicle to Cloud
VIT	Virtual Integration Testing
VRUs	Vulnerable Road Users
WP	Work Package
WPL	Work Package Leader

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1. Introduction

The European research project UP2DATE4SDV (Enabling safe & secure modular UPdates, UPgrades and DynAmic Task reallocation and Execution for Software-Defined Vehicles), aims to develop a comprehensive ecosystem for seamless and efficient software updates, hardware upgrades and situation-dependent reconfigurations of software-defined vehicles.

1.1. Project Outline

The project focuses on the definition and development of three abstraction layers

- the hardware abstraction layer (HAL)
- the OS/MW abstraction layer (OAL) for the operating system (OS) and middleware (MW)
- as well as on the exploration and prototyping of a secure orchestration and reconfiguration layer (ORP) between the vehicle and the cloud.

This will improve the reliability and performance of the CCAM system, extend vehicle life and reduce electronic waste. In addition, the project's new modularity concepts will accelerate the transition to safer, more sustainable automated driving and enable incremental steps towards Level 4 automation and longer vehicle lifecycles

The overall UP2DATE4SDV goal is to create a comprehensive ecosystem for updatable, upgradable, and reconfigurable software-defined connected and automated vehicles. This will be achieved by developing essential abstraction layers, advanced orchestrators, and an automated robust realization environment, all while adhering to the highest safety and cybersecurity standards. To achieve this vision, the project will target the following objectives:

- O1. Creation of a reconfigurable cloud connected zonal vehicle architecture blueprint based on heterogeneous COTS HW (exploiting and building on a unified HAL)
- O2. Establishing a resource composable SW deployment, execution and communication reference layer, on top of existing open-source hypervisor and OS stacks (exploiting and building on a unified OAL)
- O3. Realization of a dynamic update, orchestration & reconfiguration plane
- O4. Provide harmonized and simplified development, integration and validation processes and framework for SDV applications
- O5. Assess joint Safety and Security (SASE) of all elements from O1, O2 and O3
- O6. Demonstration of UP2DATE4SDV solution on several CCAM relevant Use Cases
- O7. Active participation around CCAM and SDV Initiative community and ecosystem

To this goal, the demonstrators and use-cases (developed in WP5) define requirements (pink arrows) for the HW and the HAL (developed in WP1), the SW and the OAL (developed in WP2) as well as for the ORP (developed in WP3). Based on that, WP1, WP2 and WP3 provide a basic functional HW-SW-demonstrator for the use-cases – UC1- after Phase 1 (M6), UC2, UC3, and UC4 after Phase 2 (M24), and finally UC5 and UC6 after Phase 3 (M36).

Besides the pure communication of results (green arrows) the proper integration of the results of WP1, WP2, WP3, and WP4 within the use-cases depends on three further cooperation aspects: the safety and security assessment (yellow arrows), the update-, upgrade-, and reconfiguration-processes and the involved component-interfaces (purple arrows), and the cloud-based MBSE-representation of

actual HW-/SW-components during the DevOps cycle establishing the real-world to cloud connection according to digital twins (blue arrows). Finally, while WP6 oversees the dissemination, communication, and exploitation of the project's results, WP7 coordinates all the WP and their communication, internally as well as externally to the SDV Initiative and to other CCAM partnerships. Figure 1 summarizes the described interaction and communication between the work-packages (WPs) of UP2DATE4SDV.

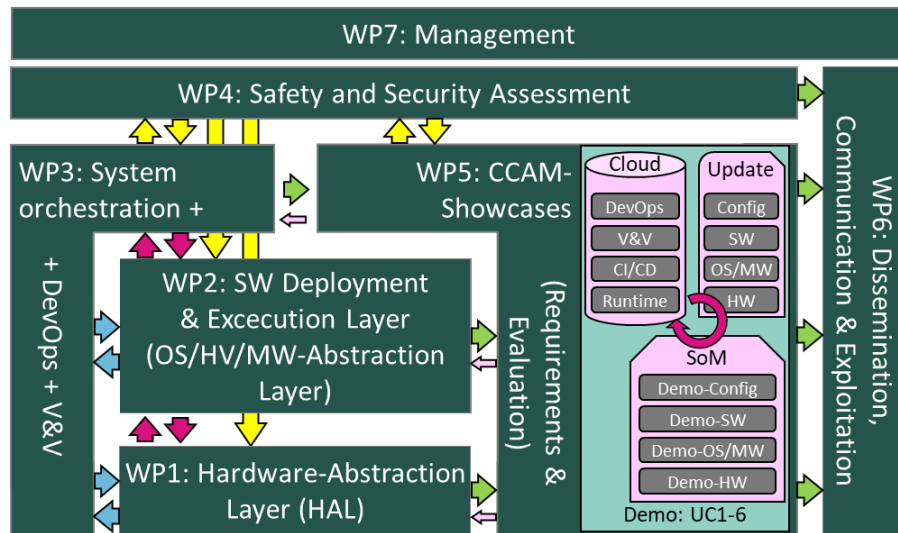


Figure 1: Overview of the UP2DATE4SDV work-packages and their Interaction.

1.2. Technical Deliverable-Map

UP2DATE4SDV has defined 38 deliverables of which 10 have an organizational nature and 28 a technical nature. To provide orientation to the reader, Figure 2 shows a technical deliverable map that gives a structural overview of all technical deliverables and their content-wise relation.

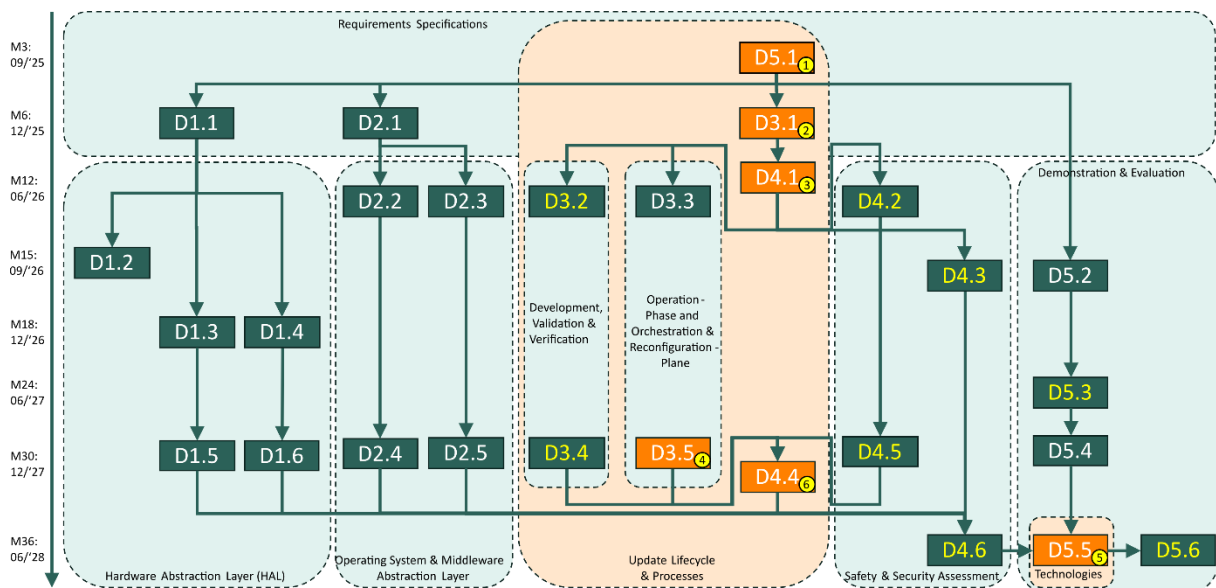


Figure 2: Overview of the UP2DATE4SDV technical deliverable map, showing the deliverables of the technical work-packages WP1-WP5, with restricted deliverables highlighted by the yellow text, a main-track highlighted by the orange nodes, and a recommended reading-order in the yellow circles. The arrows between deliverables are indicating the content development.

Deliverables are shown as rectangles, which are connected by arrows if the content of one deliverable is based on the contents of previous ones. The text in the rectangles shows the deliverable number and it is highlighted in yellow, in case of restricted deliverables, whereas public deliverables are labelled in white. The light-green and light-orange areas form technical content-categories, close but not equal to the work-packages. They show the hardware abstraction layer (HAL) in WP1, the Operating-System and Middleware Abstraction-Layer (OAL) in WP2, the Safety and Security Assessment in WP4, and the Demonstrators and the Evaluation in WP5, but they combine the Orchestration and Reconfiguration-Plane of WP3 with the safety- and security-analysis and corresponding measurements from WP4, forming the area of the Update Lifecycle and Processes, where Development, Validation and Verification, and Orchestration and Deployment of Updates are covered. Furthermore, the four initial deliverables of the work-packages requirements-definitions are also combined in a separate area at the very top. To get an overall impression of the full project, the main story-track of deliverables is highlighted in orange, and a suggested reading-order is indicated by numbers in yellow circles.

1.3. Work-Package Outline

1.3.1. Work-Package Objectives

The main purpose of Work Package 7 is to guarantee the success of UP2DATE4SDV objectives by managing both at an administrative and technical level conformingly to the GA & CA. This will be accomplished with

- 1.) continuous monitoring to deliver objectives within the time and budget constraints;
- 2.) ensuring a clear and effective liaison with the EC, and communication between partners;
- 3.) establishing and enforcing effective management and quality procedures;
- 4.) providing efficient operational management support;
- 5.) delivering the project data management plan

1.3.2. Work-Package Description

To monitor and control the project progress of UP2DATE4SDV, the project management consists of the following four major tasks starting from the very beginning in month M1 and running until the end of the project in M36:

- T7.1: Administrative, financial and legal to manage the project according to the Project Management Handbook (D7.1), establishing and maintaining the central Project Management Processes by a Project Management Team, undertaking the full range of managerial, administrative, supporting, and coordinating activities like managing and transferring funds, dealing with all contractual matters, communicating with the EC, etc.
- T7.2: Project coordination, risk and quality management to perform the technical project coordination by means of monitoring the progress, coordinating the work-packages, preparing and leading technical project meetings and reviews, appointing reviewers to assess the quality of deliverables before their delivery to the EC ensuring the Quality Assurance Plan, assessing and handling project risks following the Risk Management Plan, solving technical conflicts, etc.
- T7.3: Internal communication, Data Management Plan and Open Access Plan to ensure smooth and efficient information flow between all partners and through clear communication channels, to exchange and collaborate on documents and data via

collaborative tools, and to define the life cycle for all datasets and open-source data that will be collected, processed, or generated by the research project according to the main elements of the data management policy.

- T7.4 Industrial Advisory Board (IAB) Management to set up and communicate with the IAB, to prepare, coordinate and execute the evaluation and review by the IAB, as well as to consider the advice of the IAB to improve the quality of the project results.

1.3.3. Work-Package Status

As part of T7.1 of WP 7, UP2DATE4SDV has successfully installed its project management team, organized the kick-off meeting, managed the payment of the pre-financing, coordinated the negotiation of the Consortium Agreement, defined central management processes, summarized by deliverable D7.1, delivered the Project Management Handbook, and prepared this Data Management Plan (D7.2). The Data Management Plan (DMP) aims to transparently inform about how UP2DATE4SDV generates, collects and handles data, including data protection, ethical considerations, and legal compliance. Based on these results, the work-package status is as planned.

1.4. Purpose and Scope of the Deliverable

This deliverable – the Data Management Plan (DMP) – outlines how data is managed during the project from an internal and external point of view. It describes the life cycle for all datasets that will be collected, processed, or generated by UP2DATE4SDV, providing an analysis of the main elements of the data management policy that is used by all applications with regard to all datasets, according to the guidelines on data management. As a key element of professional data management, it characterizes the existing and planned data management, data security, data access, and data processing policies. Furthermore, the DMP documents the context in which research data is created and how it is handled, and serves to interpret, reproduce, and use the research results in the later years of the project. Finally, the DMP commits UP2DATE4SDV to comply with EU regulations, including the GDPR and the FAIR data principles.

To adapt to the project developments, the DMP will be updated three times throughout the project: Six months after project start, in M6, the DMP will be published in its initial version (D7.2 - initial version). At midterm, in M18, an update follows in D7.3 - intermediate version. Finally, concluding the project, at M36 the DMP will be updated a second and last time in D7.4 - final version.

2. Data Outline

To fulfil the project's research tasks, UP2DATE4SDV will collect, generate, process, and share various types of research data (e.g. document files, source codes, test- and configuration data, etc.), mainly in the fields of software development, connected cooperative and automated mobility systems, and related safety and security software. The following data summary provides an overview of the purpose, types, origin, expected size, and potential utility of the data that will be handled during the project.

2.1. Data collection and technical classification

Due to the project's structure and time-plan, data generation, collection, analysis, compilation, preparation, and cleansing are ongoing activities throughout the entire project duration from 01.07.2025 to 30.06.2028.

Technically, the project data can be categorized into three main groups of data:

1.) Software Source Code and Binaries:

The core research data comprises the source code developed for the software components that are developed in UP2DATE4SDV. This includes mainly the components of the Hardware Abstraction Layer (HAL), Operating System and Hypervisor Abstraction Layer (OAL), the middleware (MW) components, the Orchestration and Reconfiguration Plane (ORP) as well as associated development and deployment software, like modeling-tools, CI/CD pipelines, and verification- and validation-Tooling (V&V).

2.) Test and Simulation Data (Scenarios):

Driving scenarios and test data are required to validate (V&V) the update- and reconfiguration-processes along with safety and security mechanisms within realistic environment conditions. For that purpose, the project relies primarily on secondary data – in detail: publicly available datasets free of charge – and synthetically generated data from simulation. A collection of sensitive real-world data from a public test-field is not planned.

3.) Project Documentation:

In addition to the previously described technical data, standard research data in the broader sense is generated, e.g. for the project planning, management, and documentation, including especially technical specifications, interim reports, and scientific publications.

Prior to the finalization of the project, a comprehensive review, compilation, preparation, and cleansing of data will be conducted, ensuring that all datasets meet the FAIR principles, required repository standards, and regulatory requirements before archiving the data for long-term preservation. Nevertheless, after end of the project, some specific data-collection and preparation will continue for two reasons: First, to conclude the project from a management perspective, collecting all data about final costs, final reporting, etc. Second, to trace impact and project success based on the continuing dissemination and exploitation data. Eventually, the data collection will terminate 5 years after the end of the project.

2.2. Purpose of Data Collection and Generation

The UP2DATE4SDV project will collect, generate, use, and reuse various types of data, focusing especially on data for the specification, implementation, configuration, and testing of an updatable, upgradable, and reconfigurable, automotive high-performance computer. Primarily, this data will be manually encoded by programming synthetically generated (e.g. by simulation), re-used from publicly available data, or online recorded via observation of tests in a restricted, non-public test-environment. Finally, its goal is to develop, validate, and document research methodologies and prototypes based on hardware and software and to evaluate their validity and performance. In this way the data will become valuable to external stakeholders from industry and academia. This is a fundamental objective for the project, as it builds the foundations for implementing the research in updatable, upgradable, and reconfigurable SDV architectures.

2.3. Data Origin

The research data is exclusively generated by the project partners – i.e. within the consortium. Additional non-research data will originate from various external sources, e.g. existing code-repositories, databases, literature reviews, and data collected through surveys and interviews. Some of this data may be classified as personal data and will be anonymized before being made public. In

the case of test data (e.g. driving scenarios), the project will use synthetic data, where possible, and secondary data that is publicly available and free of charge.

2.4. Types, Formats and Size of Data

From the current, early perspective, the estimated data volume over the whole project duration will roughly be between 35GB to 75GB, comprising of:

- Software Development Data (Source Code, Binaries): approx. 10 – 20 GB.
- Project Documentation Data: approx. 5 GB.
- Simulation and Test Data: approx. 20 – 50 GB.

Currently approx. 5-10 GB of these data are expected to become publicly available, while the remaining amount is expected to belong to intermediate internal data. However, these estimates may change during the project because of new findings and change of requirements. Trying to adhere to open standards and to promote data reusability, the more detailed data types, formats and amounts of data are estimated as follows:

Table 1: Estimation of primary data types, formats and sizes in UP2DATE4SDV:

Type	Purpose	Target	Origin	Format	Size	Open	Reuse
Technical and Management reports	To monitor and to recover the activity	Consortium, PO, Reviewers, Public Community (public content)	Consortium	docx, pptx, xls., pdf	3 GB	Only public deliverables	Yes
Scientific Publications	To disseminate	the scientific community, industry, and further key stakeholders	Consortium	docx, pptx, xlsx, pdf, tex	2 GB	Yes	Yes
Results	To fulfil project objectives. Some of them for exploitation purposes	Consortium	Consortium and existing standards and open source code	c, h, lib, exe, bin, py, rs, rlib, ..., xlsx, docx	5 GB	To be defined in IPR Management	Yes. Protection to be defined.
Other text documents	To fulfil intermediate objectives.	Consortium	Consortium	txt, html, yaml, xml, json, pdf, docx, pptx	1 GB	No	No

Databases	To fulfil intermediate objectives.	Consortium	Consortium	csv, xlsx, txt, json	10-30 GB	No	No
Images	To fulfil intermediate objectives.	Consortium	Consortium	jpg, gif, png, bmp	3 GB	No	No
Audio	To fulfil intermediate objectives.	Consortium	Consortium	mp3, flac, aif, wav	2 GB	No	No
Video	To fulfil intermediate objectives.	Consortium	Consortium	mp4, ogg, mj2, avchd	5 GB	No	No
Other Software	To fulfil intermediate objectives.	Consortium	Consortium and open source code	jar, sh, bash, py, c, h, lib, exe, bin, py, rs, rlib, ...	5-20 GB	No	No

3. Data sets and Data Organisation

During the execution of UP2DATE4SDV, the project will produce a wide range of different data that can be generally distinguished into reports, publications, and results, as well as intermediate data to prepare and generate the aforementioned ones.

3.1. Technical and Management Reports

Technical, scientific and management reports are the main data to document and communicate the project status, progress, and its intermediate and final results within the project and to the European Commission. The project coordinator, DLR, will be responsible to upload all reports named as Deliverables to the Grant Management System SyGMA on the EU Funding & Tenders Portal. All Deliverables labelled as “sensitive” are only accessible to the consortium and to the EU Commission, all Deliverables labelled as “public” will be uploaded and published via the EU Funding & Tenders Portal as well as via the project’s webpage and thus will become openly accessible in line with the provisions on communication and dissemination of the UP2DATE4SDV Grant Agreement. Table 2 gives an overview of the project’s public deliverables. Table 3 gives an overview of the project’s sensitive deliverables

Table 2: UP2DATE4SDV Public Deliverables

#	WP D #	D Name	Responsible	Type	C.-level	Due date (month)
D23	D5.1	Demonstrator Definitions, Metrics, and Plan	AVL	R	PU	M3
D35	D7.1	Project Handbook and Quality Guidelines	DLR	R	PU	M3
D1	D1.1	Node-level SASE-relevant properties	BSC	R	PU	M6
D7	D2.1	Requirements Specification	KK	R	PU	M6
D12	D3.1	Requirements & Drafts of the Orchestration and Reconfiguration Plane (ORP)	DLR	R	PU	M6
D29	D6.1	Dissemination and Communication Report [Initial]	AVL	R	PU	M6
D36	D7.2	Data Management Plan	DLR	R	PU	M6
D8	D2.2	Container Prototype [Initial]	KK	R	PU	M12
D9	D2.3	Communication Plane Prototype [Initial]	ZSC	R	PU	M12
D14	D3.3	Safe and secure orchestration and reconfiguration plane [Initial]	NEO	R	PU	M12
D17	D4.1	UP2DATE4SDV Update Procedure and Architecture [Initial]	DLR	R	PU	M12
D2	D1.2	SoC observability and controllability channels	BSC	R	PU	M15
D24	D5.2	Basic Technology Implementation and Evaluation [Initial]	DLR	OTHER	PU	M15
D3	D1.3	Configurations and monitoring services [Initial]	ZSC	R	PU	M18
D4	D1.4	Modular System-on-Module HW platform [Initial]	STM FR	R	PU	M18
D31	D6.3	Dissemination and Communication Report [Intermediate]	AVL	R	PU	M18
D37	D7.3	Data Management Plan [M18]	DLR	R	PU	M18
D5	D1.5	Configurations and monitoring services [Final]	ZSC	OTHER	PU	M30
D6	D1.6	Modular System-on-Module HW platform [Final]	STM FR	OTHER	PU	M30
D10	D2.4	Container Prototype [Final]	KK	OTHER	PU	M30
D11	D2.5	Communication Plane Prototype [Final]	ZSC	OTHER	PU	M30
D16	D3.5	Safe and secure orchestration and reconfiguration plane [Final]	NEO	OTHER	PU	M30

D20	D4.4	UP2DATE4SDV Update Procedure and Architecture [Final]	DLR	R	PU	M30
D26	D5.4	Basic Technology Implementation and Evaluation [Intermediate]	DLR	OTHER	PU	M30
D27	D5.5	Basic Technology Implementation and Evaluation [Final]	DLR	OTHER	PU	M36
D33	D6.5	Dissemination and Communication Report [Final]	AVL	R	PU	M36
D38	D7.4	Data Management Plan [M36]	DLR	R	PU	M36

Table 3: UP2DATE4SDV sensitive Deliverables

#	WP D #	D Name	Responsible	Type	C.-level	Due date (month)
D30	D6.2	Exploitation Plan and IPR Management Report [Initial]	TAAT	R	SEN	M6
D13	D3.2	DevOps and V&V Framework [Initial]	AVL	R	SEN	M12
D18	D4.2	SASE Mechanisms [Initial]	IKL	R	SEN	M12
D19	D4.3	SASE Assessment [Initial]	IKL	R	SEN	M15
D32	D6.4	Exploitation Plan and IPR Management Report [Intermediate]	TAAT	R	SEN	M18
D25	D5.3	Demonstrators Implementation and Evaluation [Initial]	AVL	OTHER	SEN	M24
D15	D3.4	DevOps and V&V Framework [Final]	AVL	OTHER	SEN	M30
D21	D4.5	SASE Mechanisms [Final]	IKL	OTHER	SEN	M30
D22	D4.6	SASE Assessment [Final]	IKL	R	SEN	M36
D28	D5.6	Demonstrators Implementation and Evaluation [Final]	DLR	OTHER	SEN	M36
D34	D6.6	Exploitation Plan and IPR Management Report [Final]	TAAT	R	SEN	M36

3.2. Scientific publications

Next to deliverables which are labelled with the dissemination level "public", UP2DATE4SDV will publish scientific articles, posters, and presentations about the project's research results. Following the provisions on communication and dissemination of the UP2DATE4SDV Grant Agreement, UP2DATE4SDV supports the European commission's demands to push open access to results (e.g. via OpenAIRE, ZENODO, arXiv etc.), wherever possible. For that, UP2DATE4SDV implements a data handling policy for disseminating results via publications according to the UP2DATE4SDV Consortium Agreement as follows:

- 1.) Publication pre-prints as well as the final publisher's version of UP2DATE4SDV publications done on different scientific conferences, workshops and journals will be uploaded to the project-wide accessible Teamsite at DLR.
- 2.) However, prior to submitting any scientific publication, the involved authors will contact the project's Executive Board (EB) to revise and validate the publication such that the consortium jointly decides about the access to the research data (open access free of charge or restricted access and/or use) based on the ownership, the dissemination and exploitation interests, and the legal and contractual conditions of the UP2DATE4SDV Consortium Agreement. The review will be done based on the draft copy uploaded to the UP2DATE4SDV Teamsite.
- 3.) The open-access process is then launched by the acceptance of a publication by an international publisher (IEEE, ACM, Springer, Elsevier, etc.) conference or workshop. Depending on the publisher, a golden or green open access path will be taken. The partner leading the publication as the first author will coordinate the open access publication. In parallel, a local copy will be stored on the UP2DATE4SDV Teamsite.
- 4.) If possible, according to the Open Access model (Green Open Access, Gold Open Access, etc.), publications that are decided to become openly accessible will also be published via the UP2DATE4SDV project website.

Overall, the project will promote the Green Open Access approach and commits to give open-access to all peer-reviewed scientific publications generated during the project execution. This way full accessibility of the research results will be assured. The project may also make use of punctual Gold Open Access approaches by publishing on conferences/workshops that support this modality or by paying a Golden Open Access fee on journals (whenever this fee is affordable).

Furthermore, UP2DATE4SDV will also evaluate the usage of publication services provided by open access platforms like e.g. OpenAIRE. This platform provides an overview of publications from projects funded by the EC such that users can comfortably choose a project and see all openly accessible publications of that project itself as well of associated ones. To enable interested users to find publications of UP2DATE4SDV the consortium evaluates to use open access platforms like OpenAIRE.

3.3. Results

In UP2DATE4SDV, a large spectrum of results will be generated related to the comprehensive ecosystem for updatable, upgradable, and reconfigurable software-defined connected and automated vehicles, ranging from the Hardware Abstraction Layer (HAL) across Operating System and Hypervisor Abstraction Layer (OAL), the middleware (MW) components, the Orchestration and Reconfiguration Plane (ORP), to associated development and deployment software, like modeling-tools, CI/CD pipelines, and verification- and validation-Tooling (V&V). As previously outlined, results can be provided as documents, software, or data-sets from measurements and for simulation and testing. Table 4 outlines the expected formats and the targeted repositories where the different types of results will be stored. In general, the UP2DATE4SDV Grant Agreement and the continuously updated Dissemination and Exploitation Plan identify and define, if and how relevant results from the project will be deposited with restricted access (only to the consortium) and if and how they will be exploited. Forms of protection (patent, software registration, licensing type etc.) will then be defined in the IPR Management task, although the baseline was defined in the CA. Regarding the foreground ownership, it is agreed that it will be the property of the beneficiary carrying out the work to generate it. When

beneficiaries have jointly carried out work generating foreground and when their respective share of the work cannot be ascertained, they will have joint ownership of such foreground. They will establish an agreement regarding the allocation and terms of exercising the joint ownership, including definition of the conditions (compensation to the other joint owner(s), time plans etc.) for granting licenses to third parties.

Table 4: Types of UP2DATE4SDV Results

Results Type	Format	Examples	Repository	Reuse
Documents	pdf	Public Deliverables, Publications	Gitlab, Teamsite, Confluence	public, according to Grant Agreement and Dissemination and Exploitation Plan
Software Source Codes	c, h, py, rs, ...	Software-components of the HAL/OAL/ORP, CI/CD pipeline-configurations and -interfaces, V&V tools, etc.	Gitlab, Teamsite	Depends on exploitation plan & thorough IPR analysis
Software Binaries, Libraries and executables	dll, bin, exe, lib, rlib, ...	Software-components of the HAL/OAL/ORP, CI/CD pipeline-configurations and -interfaces, V&V tools, etc.	Gitlab, Teamsite	Depends on exploitation plan & thorough IPR analysis
Data-sets	csv, xlsx, txt, json	Measurements, driving-scenarios, test-data	Gitlab, Teamsite	Project-internal during the project

3.4. Event Media Content

UP2DATE4SDV collects pictures, video, and audio-content for communication and dissemination purposes (e.g. via the project website, social media, newsletters, etc.). All collected visual and media content will comply with GDPR requirements, ensuring that personal data is not shared without proper consent. Images and videos where individuals are incidentally included, or where no personal details are involved, will be handled according to best practices to avoid any unintended breaches of privacy. Before any visual or media content that includes individuals is shared publicly, the processing will adhere to the legal requirements outlined in Article 9 of the GDPR for special categories of personal data. Explicit consent will be obtained wherever necessary, particularly when visual data may reveal sensitive information, such as biometric identifiers. In cases where visual content contains less sensitive personal data, other legal bases under GDPR may also be applicable (under the management and control of the Project Executive Board). All visual and media content will be used for dissemination only if it meets the compliance standards set by GDPR, ensuring that individuals' rights and privacy are protected.

4. Data Management and Protection Strategy

All relevant UP2DATE4SDV documents will be available to all partners via a Sharepoint-System (called Teamsite) that is hosted by DLR and a joint Cooperation Platform, called Automotive Engineering Center (AEC) hosted by Aumovio/Continental (CON). Both will be adjusted and extended according to

the needs of the project, creating new folders or sub-folders including all working documents, final documents, legal documents, templates, and any ready-to-use documents generated by the project team members, as well as any work-data required for the execution of the project. For that,

- the project Teamsite, hosted by DLR, has been set up as the central element of data exchange; all partners can access the Teamsite at the internally shared URL.
- the Automotive Engineering Center (AEC) is used as a project management platform to jointly document meetings, collect status information, plan and exchange information about dissemination activities, as well as to collect and to track the project's technical requirements; all partners can access the Automotive Engineering Center at the internally distributed URL.

The contact person for data management is the project coordinator, Gregor Nitsche (E-Mail: gregor.nitsche@dlr.de, Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)).

4.1. Metadata and Referencing

To ensure the FAIR principles, Findable, Accessible, Interoperable, and Reusable Data, UP2DATE4SDV implements:

- Standardized Documentation:
- Each software repository contains a mandatory README file in Markdown format (.md) documenting which data is contained, its purpose, installation, dependencies, licensing, etc.
- Metadata Standards:
- To improve machine readability and machine findability the metadata description will follow a metadata standard as CodeMeta, DataCite, or Dublin Core.
- Open and Interoperable File Formats:
- To increase reusability, the use of open, interoperable formats (e.g., pdf, md, csv, json, png) is intended. The use of proprietary formats will be limited to technical minimums.

4.2. Data versioning

Source code and technical documentation are versioned in a GitLab repository and a Teamsite provided by DLR. Deliverables and Management Documents are versioned at the Teamsite as well as via Gitlab and/or the project Confluence provided by Continental (Aumovio). The reuse of versioned data follows the rules for the data sets (i.e. Technical and Management Reports, Scientific Publications, and Results) according to Section 3, as well as the rules of the consortium agreement and the exploitation plan according to a thorough IPR analysis.

4.3. Data Structuring & Collaborative Work

All relevant UP2DATE4SDV documents will be available to all partners via both the Sharepoint-System (Teamsite) hosted by DLR and the Aumovio Engineering Center (AEC) hosted by Aumovio (formerly Continental) CON. As already mentioned, they will be adjusted and extended according to the needs of the project, creating new folders or sub-folders including all working documents, final documents, legal documents, templates, and any ready-to-use documents generated by the project team members, as well as any work-data required for the execution of the project.

Furthermore, for the joint writing of code and publications, a Gitlab version-control system is hosted by DLR, with shared access being granted to all project members. In the following subsections, we explain these central tools to promote joint collaboration and data exchange across partners.

4.3.1. UP2DATE4SDV Teamsite

The project's Teamsite, hosted by DLR is the central element of data storage and data exchange. Teamsite-access is managed by DLR. Access can be requested by e-mail. After that, consortium members can access the Teamsite at the internally distributed URL.

To cooperatively work on documents at the Teamsite, each such document shall have its own directory at the Teamsite together with subdirectories named “/archive” for storing each previous version and “/latest” for storing the latest version. Based on that, editing a document shall mean to:

- edit the file in the “/latest” directory without changing its file name and to leave the change-tracking to the version-control of the Teamsite. Previous versions are then available via the 3-dots-menu (“...” or “:”) of each file or directory and selecting version control (“Versionskontrolle”).
- copy the file from the “/latest” directory to the “/archive” before changing any contents in the “/latest” directory and prefix the filename of the copy in the “/archive” with “<yyyy-mm-dd>[_<nmNo>_]” – where “<yyyy-mm-dd>” denotes the current date using four digits for the year, two digits for the month and two digits for the day, and “<nmNo>” denotes an editor's short name followed by a running number, if there are many changes of different editors at one day, and if it is important to additionally store a major revision of the document redundant to the version control of the Teamsite.

To help finding and managing documents, the Teamsite provides and asks to use the following directory structure outlined in Table 5. Furthermore, for meetings, events or similarly time-related subdirectories, UP2DATE4SDV also uses the prefix “<yyyy-mm-dd>[_<nmNo>_]” as defined directly above.

Table 5: Directory structure at the UP2DATE4SDV Teamsite.

\1-Proposal	\5-Work
\1-Proposal\1-Graphics	\5-Work\WP1
\1-Proposal\2-Supporting_and_Background_Documents	\5-Work\WP2
\1-Proposal\3-Financial_Calculations	\5-Work\WP3
\1-Proposal\4-Working_Documents	\5-Work\WP4
\1-Proposal\5-Submitted_Documents	\5-Work\WP5
\2-Organization	\5-Work\WP6
\2-Organization\IAB	\5-Work\WP7
\2-Organization\Links	\6-Deliverables
\2-Organization\MeetingStructure	\6-Deliverables\WP1
\2-Organization\Polls	\6-Deliverables\WP2
\2-Organization\Templates	\6-Deliverables\WP3
\2-Organization\vacationCalendar	\6-Deliverables\WP4
\3-Management	\6-Deliverables\WP5
\3-Management\1-Contracts	\6-Deliverables\WP6
\3-Management\2-Controlling	\6-Deliverables\WP7
\3-Management\3-Reporting	\7-Dissemination
\3-Management\4-Correspondence	\7-Dissemination\10-Workshops_and_Events
\4-Meetings	\7-Dissemination\1-Articles_and_Press_Releases
\4-Meetings\0-WorkpackageMeetings	\7-Dissemination\2-Papers
\4-Meetings\2025-04-30_PM_GAP-Status&KickOff-Preparation	\7-Dissemination\3-Presentations
\4-Meetings\2025-05-09_LGLs_CA-Negotiation	\7-Dissemination\4-Abstracts_and_Executive_Info
\4-Meetings\2025-07-23_KickOffMeeting	\7-Dissemination\5-Flyers
\4-Meetings\2025-07-30_KickOffFollowUpMeeting	\7-Dissemination\6-Logos
\4-Meetings\2025-09-09to10_TechnicalMeetingQ1	\7-Dissemination\7-Posters
	\7-Dissemination\8-Related_Dissemination
	\7-Dissemination\9-Other_Media

4.3.2. Aumovio Engineering Center (AEC)

The Aumovio Engineering Center (AEC) – formerly Continental Cooperation Platform (CCP) – hosted by Aumovio – formerly Continental – provides the central project management platform to jointly collect meeting minutes, report status information, plan and exchange about dissemination activities, as well as to collect and track the project’s technical requirements based on Confluence. Access to the AEC is managed by Aumovio (CON) and can be requested by e-mail to CON and DLR. After an initial login, all partners can access the AEC at the internally distributed URL.

The Management pages of UP2DATE4SDV at the AEC Confluence are structured into the central subpages “/01 - Documents”, “/02 - Project Management”, and “/03 – Work Area” with subpages for milestones, deliverables, meetings, risk and change management, dissemination, quarterly reporting, as well as a subpage with further subpages per work-package. Adding and changing pages and comments is possible via the top-right editing menu, which is where is also a three-dots-menu (“...”) providing access to change-tracking (“Änderungshistorie”).

To properly cooperate in AEC, the following Confluence mechanisms should be known and shall be extensively used, when editing the Confluence pages:

- Mention users on pages to notify them about the existence of and the information on that page by typing “@<e-mail>”, with “<e-mail>” denoting the registered e-mail address of the user to be mentioned
- Add tasks by typing “[” directly followed by “]” or clicking the checkmark in the top-menu of the editing page
- Assign tasks to a responsible user by mentioning him somewhere in the description of the task using the previously explained “@<e-mail>” syntax
- Schedule tasks with deadlines for accomplishing the task by typing “//<dd-mm-yyyy>” where “<yyyy-mm-dd>” denotes the current date using four digits for the year, two digits for the month and two digits for the day
- Regularly check own tasks by clicking the profile-icon on the top-right and selecting tasks (“Aufgaben”)
- Confirm tasks when they are accomplished by clicking to the checkmark-field of the task
- Add comments to pages, typing into the comment field below every page and mention any users you want to inform about your comment, using the previously explained “@<e-mail>” syntax
- Add inline-comments to specifically selected parts of a page, by selecting the content to be commented, pointing the mouse pointer at the selection (i.e. hover it above), and click the occurring text-bubble icon;
- Mention users in comments and inline-comments using the previously explained “@<e-mail>” syntax to inform them about your comments

When adding new pages, check if the higher-level page(s) ask(s) you to use tags and/or templates for the page you are adding and use such tags and/or templates

4.3.3. UP2DATE4SDV Gitlab

The project’s Gitlab, hosted by DLR is the version and dev-ops control system for the collaboration on software code, publications, and other files that strongly require version-control, but also for the

automation of code-compilation, testing, and deployment. Access to the Gitlab is managed by DLR, coupled to the Teamsite-access, and can be requested by e-mail. After an initial login, it is available to all consortium members at the internally distributed URL.

To learn the main mechanisms and processes of Gitlab, tutorials can be found online, e.g. at URL: <https://docs.gitlab.com/tutorials/>.

4.3.4. Data Security and Data Storage

According to the CA, all project partners are authorized to have access to the shared data at the Gitlab, the AEC, and the Teamsite-Sharepoint. Access control is managed by the project coordinator (DLR). To ensure secure data storage, curation, and access, all data repositories are based on secure servers with secure login credentials, role-based access-control, encryption protocols (e.g., HTTPS, TLS), and regular backups to ensure data integrity.

Furthermore, periodic backups, data archiving, and the use of open, non-proprietary formats shall support long-term accessibility and tool-compatibility to ensure the longevity of the data. Using access-control, automated backup-mechanisms, and encryption, UP2DATE4SDV mitigates the risks of unauthorized data access, data loss and GDPR violations. For long-term data storage public data shall be archived at Zenodo/OpenAire and in the DLR archive. Sensitive data will be archived locally at the data archive of the coordinating DLR institute.

Long-term contact for the UP2DATE4SDV data is the project coordinator (DLR) in person of Gregor Nitsche (gregor.nitsche@dlr.de).

4.3.5. Data Protection

According to the CA, the Parties agree to abide by the standard General Data Protection Regulation (GDPR) of the EU, (<https://eur-lex.europa.eu/legal-content/DE/TXT/?qid=1487056769872&uri=CELEX:32004D0915>). The project does not involve human subjects or the collection of sensitive personal data (biometrics, health data). Test data relies on synthetic scenarios or anonymized simulations to prevent re-identification. In alignment with GDPR and project governance, the project coordinator – i.e, DLR, Deutsches Zentrum für Luft- und Raumfahrt e.V. – acts as the primary contact point for data protection inquiries and privacy-related requests.

4.3.6. Ownership and Copyright

According to the CA, the results are owned by the Party that generates them. Joint ownership is governed by Grant Agreement Article 16.4 and its Annex 5 (Ownership of results), with the additions of Articles 8.2.1 – 8.2.3 of the CA. A clarification of the ownership as well as the definition of the restriction or license protection type will be agreed on an incremental base (component-by-component, document-by-document) in the Exploitation and IPR Management task of WP7.

According to the GA the granting authority does not obtain ownership of the results produced under the action. However, the granting authority has the right to use non-sensitive information relating to the action and materials and documents received from the beneficiaries (notably summaries for publication, deliverables, as well as any other material, such as pictures or audio-visual material, in paper or electronic form) for policy, information, communication, dissemination and publicity purposes, during the action or afterwards.

The right to use the beneficiaries' materials, documents and information is granted in the form of a royalty-free, non-exclusive and irrevocable license, which includes the following rights:

- 1.) use for its own purposes (in particular, making them available to persons working for the granting authority or any other EU service (including institutions, bodies, offices, agencies, etc.) or EU Member State institution or body; copying or reproducing them in whole or in part, in unlimited numbers; and communication through press information services)
- 2.) distribution to the public (in particular, publication as hard copies and in electronic or digital format, publication on the internet, as a downloadable or non-downloadable file, broadcasting by any channel, public display or presentation, communicating through press information services, or inclusion in widely accessible databases or indexes)
- 3.) editing or redrafting (including shortening, summarizing, inserting other elements (e.g. meta-data, legends, other graphic, visual, audio or text elements), extracting parts (e.g. audio or video files), dividing into parts, use in a compilation)
- 4.) translation
- 5.) storage in paper, electronic or other form
- 6.) archiving, in line with applicable document-management rules
- 7.) the right to authorise third parties to act on its behalf or sub-license to third parties the modes of use set out in Points (b), (c), (d) and (f), if needed for the information, communication and publicity activity of the granting authority
- 8.) processing, analysing, aggregating the materials, documents and information received and producing derivative works.

The rights of use are granted for the whole duration of the industrial or intellectual property rights concerned.

4.4. FAIR Data & Open Access

To ensure the FAIR principles, Findable, Accessible, Interoperable, and Reusable Data, UP2DATE4SDV uses open and interoperable file formats wherever it is possible and plans to implement a standardized code documentation concept with machine readable metadata, e.g. in the CodeMeta metadata format.

For long term reusability, the openly accessible publication of public reports and open-source results via the open science service of Zenodo/OpenAIRE will be evaluated. However, only reports and publications labelled as "public" will be made openly accessible. Regarding the project results labelled as "sensitive", as mentioned before, will not be made open access because of exploitation interests. The restriction or license protection type will be agreed on in the Exploitation and IPR Management task.

To support interdisciplinary interoperability, the consortium will use vocabularies, nomenclatures, and measurement units according to international scientific standards and provide glossaries of abbreviations and acronyms as well as metadata to increase understanding, findability and reusability.

4.5. Data Quality and Data Management Monitoring

To assure high quality data, UP2DATE4SDV implements partner-internal peer-review of the data during generation and before publication, automated testing of data via CI/CD pipelines and automated tests, and version control via GitLab and the Teamsites-Sharepoint. Furthermore, a coordinated data quality assurance process and a Data Management Monitoring Template is planned to describe and monitor the dataset-status, its validation and its peer review. Table 6 shows a first draft of the planned Data Monitoring Template.

Table 6: Data Monitoring Template

Information Type	Explanation of the Information
UID (Reference/Name)	Unique identifier for the dataset (incl. Version)
Related Deliverables	Associated deliverables that the dataset supports
Access Level	public (external) restricted (internal)
Data Sharing Platform	Platform for sharing the data
Targeted Audience	Intended audience for data reuse (e.g., researchers, public)
Type	Type of data (e.g., text, software, image)
Format	Formats used for storing and sharing the data (e.g., CSV, JSON, PDF)
Reusability	Whether the data can be reused and under what conditions
Personal Data Included	Whether personal data is included and how it is protected
Size	Size of the dataset
Version Control	Whether and how data-changes are tracked and reversible
Backup and Security	Backup frequency and security measures (e.g., daily backup, encryption)
Metadata	Whether metadata is provided and according to which standard (e.g., Zenodo/OpenAIRE, CERIF, DataCite, etc.)
IPR Owner/Data Owner	Project Partner responsible for the dataset
Peer-Reviewed by:	Project Partners who reviewed the dataset

5. Expenses

At the current time, there is no additional costs for the repositories, the material, personnel, persistent identifiers, copyright management, long-term archiving, or webpage-development.

6. Ethical aspects and Legal Considerations

In UP2DATE4SDV the research developed within the project does not involve humans, human embryos or fetuses, human cells or tissues, personal data (e.g. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction), animals, third countries or environmental protection and safety participations. Any used simulation data will be either synthetic data, where possible, or anonymized secondary data that is publicly available and free of charge. As a consequence, the research does not have potential for malevolent or terroristic abuse and the project will fully align with Regulation (EU) 2016/679 and the GDPR, ensuring that personal data is handled with utmost care and legal compliance. During the project the Project Executive Board will be responsible for monitoring

upcoming ethical issues and will review, discuss and suggest a solution for any potential ethical challenges that arise.

7. Responsible Contact

Responsible Contact for data management, data protection inquiries and privacy-related requests is the project coordinator – i.e., DLR, Deutsches Zentrum für Luft- und Raumfahrt e.V. in person of Gregor Nitsche (gregor.nitsche@dlr.de) as the primary contact point. Nevertheless, during the project, the UP2DATE4SDV consortium will discuss the generated and collected data in the Project Executive Board to clarify ownership, copyright, and ethical questions, and answer them within the Exploitation plan and Intellectual Property Rights (IPR)