SATERA data management plan

Deliverable ID:	**D8.3**
Project acronym:	**SATERA**
Grant:	**101164313**
Call:	**HORIZON-SESAR-2023-DES-ER-02**
Topic:	**HORIZON-SESAR-2023-DES-ER-02-WA2-1**
Consortium coordinator:	**UPV**
Edition date:	**20 December 2024**
Edition:	**00.02**
Status:	**Official**
Classification:	**PU**

Abstract

This document describes the data management life cycle for all data re-used, generated, and processed throughout the SATERA's research phases. It adopts the FAIR principles—making data Findable, Accessible, Interoperable, and Reusable—to guide data handling, storage, and sharing practices.

EUROPEAN PARTNERSHIP

Co-funded by the European Union

Authoring & approval

Author(s) of the document

Organisation name	Date
UPV	06th November 2024

Reviewed by

Organisation name	Date
UPV	04th December 2024
UNITOV	05th December 2024
UNIV COIMBRA	12th December 2024
INPE	11th December 2024

Approved for submission to the SESAR 3 JU by

Organisation name	Date
UPV	17th December 2024
ENAIRE	17th December 2024
COLLINS	17th December 2024
UNITOV	17th December 2024
UNIV COIMBRA	18th December 2024
INPE	19th December 2024

Rejected by[1]

Organisation name	Date

Document history

Edition	Date	Status	Company author	Justification
00.01	06/11/2024	Initial draft	UPV	New document
00.02	17/12/2024	Draft	UPV	V1 draft

[1] Representatives of the beneficiaries involved in the project.

01.00	20/12/2024	Official	UPV	Final document

SATERA

SPACE-BASED COMPOSITE ADS-B AND MULTILATERATION SYSTEM VALIDATION THROUGH SCALABLE SIMULATIONS

SATERA

This document is part of a project that has received funding from the SESAR 3 Joint Undertaking under grant agreement No 101164313 under European Union's Horizon Europe research and innovation programme.

Table of contents

List of tables

List of acronyms

Acronym	Description
ADS-B	Automatic Dependent Surveillance–Broadcast
ADS-C	Automatic Dependent Surveillance - Contract
AIRM	ATM Information Reference Model
AoA	Angle of Arrival
ASTERIX	All Purpose Structured Eurocontrol Surveillance Information Exchange
ATM	Air Traffic Management
CERN	European Organization for Nuclear Research
COLLINS	Collins Aerospace Ireland, Limited
CORDIS	Community Research and Development Information Service

CRLB	Cramér Rao Lower Bound
DES	Digital European Sky
FDoA	Frequency Difference of Arrival
DL	Downlink
DMP	Data Management Plan
DOI	Digital Object Identifier
EATMA	European ATM Architecture
EC	European Commission
ECO-EVAL	Economic Evaluation
ENAIRE	Enaire
EU	European Union
ERP	Exploratory Research Plan
ERR	Exploratory Research Report
E-MLAT	Enhance - Multilateration
FAIR	Findable, Accessible, Interoperable, Re-usable
FoA	Frequency of Arrival
FRD	Functional Requirements Document
GA	Grant Agreement
GNSS	Global Navigation Satellite Systems
GSN	Ground Subnetworks
INPE	Instituto Nacional de Pesquisas Espaciais
IPR	Intellectual Property Rights
IR	Implementing Regulations
ISL	Inter-Satellite Link
ISRM	Information Service Reference Model
LEO	Low Earth Orbit
MLAT	Multilateration
N/A	Not Applicable
OSED	Operational and Environmental Services Description
PU	Public
RIOs	Risks/Issue & Opportunities

SATERA	Space-Based Composite ADS-B + Multilateration System Validation through Scalable simulations
SEN	Sensitive
SESAR 3 JU	Single European Sky ATM Research 3 Joint Undertaking
SO	Specific Objectives
TDoA	Time Difference of Arrival
ToA	Time of Arrival
TRL	Technology Readiness Level
UNITOV	Università degli Studi Di Roma Tor Vergata
UNIV COIMBRA	Universidade de Coimbra
UPV	Universitat Politècnica de València
WP	Work Package

Table 1: list of acronyms

1 Data summary

1.1 Project overview

The SATERA project aims to develop and validate a space-based composite surveillance system that integrates ADS-B (Automatic Dependent Surveillance-Broadcast) with an enhanced Multilateration (E-MLAT) approach. The system is being developed at Technology Readiness Level 2 (TRL2) and adapts advanced ground-based surveillance technologies for efficient use in the challenging environment of Low Earth Orbit (LEO).

Key focus areas:

i) **Design of receivers** optimized for operation in LEO environments, capable of measuring signal parameters such as Time of Arrival (ToA), Frequency of Arrival (FoA), Angle of Arrival (AoA), and Signal Strength from aircraft.

ii) **Synchronization techniques** for onboard clocks and oscillators to improve the accuracy of position estimation by precisely timestamping the signals transmitted by aircraft.

iii) **Multilateration algorithms** to independently determine aircraft positions by solving a system of non-linear equations, using the optimal combination of measurements (ToA, FoA, AoA) for the unique challenges of space-based receivers.

- **Communication network** enabling real-time data transmission and system operation.

- **Satellite constellation, orbit and attitude propagation modelling** - application of orbital dynamics concept in studies of formation and maintenance of constellation in LEO for space-based surveillance purposes.

Key benefits:

i) **Composite Surveillance System:** a fusion of ADS-B and E-MLAT for more reliable and robust tracking of aircraft in remote or underserved areas. The system will provide Global Navigation Satellite Systems (GNSS) independent surveillance data, complementing ADS-B for strengthened resilience.

ii) **Improved Data Integrity:** space-based multilateration enhances the integrity of ADS-B data by offering an independent, complementary data stream. This redundancy supports the definition of integrity parameters, boosting trust in the system.

iii) **Optimized Routing Over Remote Regions:** the solution enables safer, more efficient routing over oceanic and uninhabited regions, reducing fuel consumption and improving flight efficiency.

The SATERA project seeks to transform aviation surveillance by overcoming current limitations in remote regions and enhancing global coverage. By leveraging the advantages of LEO constellations and advancing the state of space-based surveillance, the project sets the foundation for next-generation

air traffic management systems. To achieve this vision, the following specific objectives (SO) have been defined:

SO1: Formulate the concept of operations for a space-based surveillance system.

Develop a composite ADS-B + E-MLAT surveillance system utilizing a constellation of small satellites in LEO to enable worldwide aircraft detection and tracking. Establish functional and non-functional requirements to ensure compliance with EUROCAE draft ED-142A performance standard.

SO2: Develop an integrity estimation for the entire space-based ADS-B system.

Create a model to assess the reliability of the entire surveillance system, including the satellite communication network, ensuring robust downlinking of data to ground stations.

SO3: Design and validate receiver architectures for space-based operations.

Using simulations and lab measurements, develop four receiver system architectures capable of measuring combinations of Time Difference of Arrival (TDoA), Frequency Difference of Arrival (FDoA), and Angle of Arrival (AoA). This includes designing digital beamforming array antennas to measure AoA accurately, while ensuring fault tolerance against hardware, software, and cyberattack risks.

SO4: Develop a communication network architecture.

Design the inter-satellite link (ISL), downlink (DL), and ground subnetworks (GSN) to ensure the timely delivery of satellite measurements to a central processing station, adhering to the requirements specified in SO1.

SO5: Build and validate a network simulator for the communication system.

Create a simulator capable of modelling real-time traffic from up to 225 aircraft simultaneously, emulating the communication network's critical features, including latency, data loss, and reliability metrics, to support validation of the TRL2 concept.

SO6: Develop a constellation propagation model.

Formulate and validate a mathematical model to estimate the position, velocity, acceleration, and coverage footprint of small satellite constellations in LEO orbits. Validation will focus on the North Atlantic and South Atlantic operational areas, including key aviation corridors.

SO7: Create a performance prediction tool for the composite ADS-B + E-MLAT system.

Define quality parameters for the space-based surveillance system and develop a tool to compute performance as a function of satellite positions and inter-satellite network performance. Validate the tool over operational areas defined in SO6.

SO8: Develop a position estimation and tracking system.

Design a system capable of detecting and seamlessly tracking up to 225 aircraft based on the measurement capabilities of the receiving system architectures, ensuring alignment with objectives set in SO1 and SO2.

SO9: Assemble an integrated system evaluation tool.

Combine the constellation simulator, network simulator, and tracking system into a comprehensive tool capable of simulating end-to-end operations for up to 225 aircraft. The tool will compute performance metrics in line with EUROCAE ED-129C and draft ED-142A standards.

SO10: Validate the TRL2 maturity of the concept through use cases.

Conduct validation using three scenarios: one over a continental area with ground-based surveillance for cross-referencing data and two over oceanic areas to demonstrate the system's scalability and operational capabilities.

1.2 Data definition

In accordance with **Regulation (European Union - EU) 2022/868 (Data Governance Act),** *data* is defined as any digital representation of acts, facts, or information, as well as any compilation of such elements, including formats such as sound, visual, or audiovisual recordings. This broad definition encompasses a wide range of digital content, from structured datasets to multimedia files, ensuring comprehensive coverage of what constitutes data in modern digital ecosystems.

Within the SATERA project, we adopt this definition and further classify the data we generate or re-use into the following categories to ensure efficient management and clear organization:

- **Documents**

  This category includes textual and formatted digital content such as project deliverables, academic papers, regulations, standards, and other relevant written material. These are typically used for knowledge sharing, compliance, or formal communication.

- **Datasets**

  Datasets comprise structured or unstructured collections of data used for analysis, modelling, or other technical purposes. Examples include constellation data, trajectory data, and other data related to the project's objectives.

- **Communication Materials**

  This category covers all data created for the purpose of outreach and dissemination, such as presentations, brochures, social media content, and videos. These materials can take various forms, including graphical content, audio recordings, videos, and other multimedia formats. They are designed to communicate the project's goals, progress, and results to a wider audience effectively.

By adopting this classification, SATERA ensures that all data types are effectively categorized and managed, facilitating compliance with regulatory requirements and supporting the successful execution of project activities.

1.3 Re-use of existing data

The primary objective of the SATERA project is to develop a space-based composite ADS-B + E-MLAT surveillance system using a constellation of small satellites in LEO. To achieve this, extensive research will be carried out to assess the effectiveness and integration of space-based surveillance technologies. Publicly available data, as well as relevant standards and regulations, will be leveraged for this purpose.

Documents:

- **SALSA project outcomes** will support the design and development of satellite-based surveillance technologies.
- **EUROCAE standards** (ED-261, ED-129C, ED-142A, ED-78A) will provide guidance on the safety, integrity, performance, and qualification of the system.
- **EUROCONTROL documents**, such as CAT020, CAT021, CAT053 and ESASSP, will support the development and validation of the SATERA system, ensuring compliance with existing surveillance system standards.
- **ICAO standards and recommended practices, as well as manuals and guidance material** will offer essential information on surveillance systems and aircraft operations, ensuring the SATERA system adheres to international aviation safety standards.
- **European Commission implementing regulations (IR),** such as IR 2023/1770 and IR 2017/373, will secure the performance and interoperability of air and ground-based systems and the services that ANSPs provide to aircraft operators.

Datasets:

- **Datasets from ADS-B trajectories**, owned by COLLINS (a consortium member), will be used to validate the performance of the space-based surveillance system.
- **ADS-B + Radar and ADS-C trajectories**, owned by ENAIRE (a consortium member), will also be employed to assess the system's functionality and accuracy in real-world scenarios.

These datasets will play a crucial role in ensuring that the space-based surveillance system can track aircraft with enough precision, meeting integrity and performance requirements.

By leveraging these documents and datasets, SATERA will effectively evaluate state-of-the-art methodologies commonly used in space-based surveillance and aviation safety.

Below is a preliminary list of the data that will be re-used within SATERA. As the project progresses, more information will be included, and the Data Management Plan (DMP) will be updated accordingly.

Source	Data	Work Package (WP)	Link to Objective	Format	Size
EUROCAE	Standards:	WP2	SO1, SO2	DOC/DOCX/PDF	~ 45MB

	ED-261 ED-129C ED-142A ED-78A				
EUROCONTROL	Standards: Specification for ATM Surveillance System Performance (ESASSP). CAT020 - Specification for Surveillance Data Exchange ASTERIX Part 14 Category 20. CAT021 - Specification for Surveillance Data Exchange ASTERIX Part 12 Category 21.	WP2 & WP7	SO1, SO2, SO9, SO10	PDF	~20MB
European Commission (EC)	Regulations: Commission Implementing Regulation No. 2023/1770 of 12 September 2023. Commission Implementing Regulation No. 2017/373 of 1 March 2017.	WP2	SO1, SO2	PDF	~3MB
ICAO	Manuals and Plans: PBN manual doc 9613 PBN manual. PBCS manual doc 9869 PBCS manual. North Atlantic Systems Planning Group (NAT SPG). Doc 9750 Global Air Navigation Plan. Annex 10 to the Convention on International Civil Aviation – Volume IV Surveillance and Collision Avoidance Systems. Cir 326 AN/188 Assessment of ADS-B and Multilateration Surveillance to Support Air Traffic Services and Guidelines for Implementation. NAT Doc 008 Application of Separation Minima North Atlantic Region – NAT ASM.	WP2 & WP7	SO1, SO2, SO9, SO10	PDF	~15MB
Cordis – SALSA Project	Deliverables: D1.2 ADS-B user requirements. D2.4 SB ADS-B system performance assessment report.	WP2	SO1, SO2	PDF	~10MB

	D3.5 Assessment of Impact on Procedures for Revised Separation Minima. D4.3 Final Project Results Report Action Plan and Results Dissemination Report				
ENAIRE	ADS-B + Radar trajectories ADS-C	WP7	SO9, WP10	ATERIX CAT021; CAT048.	~10GB
Flight Aware - COLLINS	ADS-B trajectories	WP7	SO9, WP10	CSV, KML	~10GB (Based on the amount of historical data needed).

Table 2: re-used data within SATERA

1.4 Data generated within the SATERA project

SATERA will generate various types of data across its eight Work Packages (WPs), each tailored to the specific objectives of the respective WPs:

1. **Deliverables (All WPs)**:
   All WPs will contribute to the production of project deliverables, which include technical documents, reports, and formal outputs documenting the progress, methodologies, and results achieved within the project. These deliverables will form the backbone of knowledge dissemination and compliance reporting for the project.

2. **Datasets (mainly within WP5 and WP7)**:
   The generation of datasets is central to WP5 and WP7, which focus on the design and validation of the SATERA concept. These datasets include:

   - **Constellation Data**: initial datasets containing information about satellite constellations.
   - **Cramér-Rao Lower Bound (CRLB) Data**: computed from constellation data, these datasets include **maps** (over areas) and **linear** (along linear trajectories), derived for various combinations of measurements.
   - **Simulated Measurements**: datasets of simulated Time of Arrival (ToA), Frequency of Arrival (FoA), and Angle of Arrival (AoA) measurements generated for aircraft flying ideal trajectories.
   - **Target Reports**:
     - **ASTERIX CAT020**: generated from simulated measurements, containing position estimates of the aircraft.

- **ASTERIX CAT021**: generated from ideal trajectories, incorporating GNSS errors.

- **Composite Surveillance Reports**: tentatively produced in ASTERIX CAT053, these reports integrate data from various sources to provide a comprehensive surveillance picture.

3. **Communication Materials (WP8)**:
   WP8 will produce a wide range of communication materials designed to promote the project and engage stakeholders. These materials may include graphical content, audio, video, brochures, presentations, and other multimedia formats, all aimed at effectively conveying SATERA's objectives, progress, and outcomes to diverse audiences.

This structured approach to data generation ensures that the project outputs are aligned with its technical, validation, and communication objectives, facilitating the design, testing, and dissemination of the SATERA concept.

The following table provides a preliminary list of the data it is expected to generate within the project.

Type of data	Data/Dissemination level[2]	WP	Link to Objective	Format	Size
Documents	○ Final Operational and Environmental Services Description (OSED)/PU ○ Final Economic Evaluation (ECO-EVAL)/PU ○ Final Functional Requirements Document (FRD)/PU	WP2	SO1, SO2	DOC/DOCX/PDF	~15MB
	○ Signal features extraction systems description/PU ○ Hybrid receiving station architecture/PU ○ OD&T algorithm description/SEN ○ Guidelines to design resilient MLAT receiving stations architectures for LEO space environment/PU	WP3	SO3	DOC/DOCX/PDF	~20MB
	○ Communication network model/SEN ○ Communication network simulator/SEN ○ Dependability assessment/guidelines/SEN	WP4	SO4, SO5	DOC/DOCX/PDF	~15MB
	○ Constellation model/SEN ○ CRLB for MLAT/PU	WP5	SO6, SO7	DOC/DOCX/PDF	~20MB

[2] Dissemination level: Public – PU; Sensitive - SEN

Datasets	○ System evaluation tool/SEN				
	○ Space-based MLAT algorithms description/PU ○ Space-based MLAT algorithms prototypes/PU	WP6	SO8	DOC/DOCX/PDF	~10MB
	○ Exploratory Research Plan (ERP)/PU ○ Exploratory Research Report (ERR)/PU ○ Maturity Assessment /PU	WP7	SO9, SO10	DOC/DOCX/PDF /XLS/XLSX/CSV	~25MB
	○ Constellation Data/PU ○ CRLB Data/PU • maps • linear ○ Simulated Measurements/PU • ToA • FoA • AoA	WP5, WP7	SO6, SO7, SO9, SO10	TBD	~25MB
	○ Target Reports/PU • ASTERIX CAT020 • ASTERIX CAT021 ○ Composite Surveillance Reports – ASTERIX CAT053/PU	WP7	SO9, SO10	TBD	~50GB
Communication material	○ Videos/PU ○ Graphical material/PU	WP8	N/A	DOC/DOCX/PDF/PNG/JPG/MP4	~5GB

Table 3: generated data within SATERA

2 FAIR data

The SATERA project is committed to ensuring, whenever possible, that the data it generates adhere to the FAIR (Findable, Accessible, Interoperable, and Re-usable) principles. This commitment supports data management practices that promote transparency, reproducibility, and the broader dissemination of knowledge. The following subsections describe how the SATERA project will implement FAIR principles for its data.

2.1 Making data findable, including provisions for metadata

Naming Conventions: consistent and descriptive naming conventions will be applied to documents, datasets, and communication materials. These conventions will incorporate details such as data type, date, and edition. By default, SATERA will follow the systematic naming convention outlined in the below table.

Field	Description
Project acronym	SATERA
Underscore	"_"
Type of data (a 3 characters string)	• Document: "DOX" • Dataset: "DSX" • Communication material: "CMX" being X the WP where the item was generated.
Underscore	"_"
Title	e.g. "Video teaser"
Underscore	"_"
Edition number	"Ed_XX.YY", edition number. YY: starts from 00 and is updated during the internal production/revision process. XX: starts at 01 for the first release of the data and increments with subsequent releases.
Underscore	"_"
Date	"YYYY-MM-DD-X". YYYY: year MM: month DD: day the data was generated X: Integer used to distinguish between multiple data items created on the same day

Table 4: description of the SATERA document/dataset/communication material name fields

For example, a communication material named by SATERA could be:

"SATERA_CM8_Video teaser_Ed_01.00_2024-11-25-1".

This name indicates the following:

- The item titled *Video teaser* is of type *communication material*.
- It was produced as part of WP8.
- The edition number, Ed_01.00, represents the first release.
- The data was created on 2024-11-25, and -1 identifies it as the first item generated on that date.

Regarding deliverables published by SATERA, they will have a unique identifier according to the project document coding system described in the table below.

Field	Description
Project acronym	SATERA
Underscore	"_"
A 4 characters string	"DX.Y", being X the WP where the deliverable is produced and Y the number assigned to the document in the WP deliverable list.
Underscore	"_"
Deliverable name as it appears in Grant Agreement (GA)	e.g. "Data Management Plan (DMP)"
Underscore	"_"
Edition number	"Ed_XX.YY", edition number; YY starts from 00 and is updated during the internal production/revision process; XX starts in 01 when the deliverable is submitted to SESAR 3 JU for revision and is updated in the event the deliverable is rejected and must be completely rebuilt.

Table 5: description of SATERA deliverable name fields

An example of deliverable naming is:

"SATERA_D8.3_Data Management Plan (DMP)_Ed_01.00"

That means the deliverable named "Data Management Plan (DMP)" is the third deliverable in the WP8 list of deliverables. The edition number indicates that this version is the first one sent to SESAR 3 JU.

Metadata: a specific metadata template will be created based on standardized frameworks, ensuring consistency and interoperability. At a minimum, this template will include the following fields: Digital Object Identifier (DOI), Type of Data, Title, Publication Date, Authors, Contributors, Description, Keywords, Language, and Version.

Persistent Identifiers: if possible, data and associated metadata will be assigned unique and persistent identifiers (e.g., DOIs) to ensure long-term traceability.

Data and Metadata Registries: metadata will be catalogued in public repository Zenodo to enhance discoverability.

Version Control: clear versioning of data will be maintained to enable traceability of changes and updates throughout the project lifecycle.

2.2 Making data accessible

2.2.1 Repository

SATERA project will use the following repositories to store data within the scope of this DMP (see sections 1 and 3):

- **Beneficiaries' platforms:** each project partner generating data within the project is responsible for storing data internally on protected servers and controlling access to them.
- **TEAMS site:** for the duration of the project, a TEAMS site will be used to work in a collaborative manner mainly on internal documents/data as well as to exchange information. Access to the TEAMS site is limited to persons who are actively involved in the project.
- **STELLAR platform:** as part of the SESAR programme, SATERA project will use STELLAR as a repository provided by SESAR 3 JU. It will be used to store final and draft versions of the deliverables and the information/data produced in support of the exercises.
- **EU participation portal:** final versions of the deliverables will be uploaded there.
- **Zenodo:** The open SATERA results will be deposited into Zenodo (www.zenodo.org).

2.2.2 Data

Some of the data reused by SATERA will be subject to intellectual property rights (IPR) and will not be disclosed. Besides, not all data produced by SATERA will be publicly available (see table 3 for details). Openly available data will be mainly final versions of the deliverables, and some other data generated in support of the validation exercises, excluding any data affected by IPR. Data generated by SATERA project will be available as follows:

- Information/data stored in TEAMS will be available for the project partners during the execution of the project and two additional years after the end of the project. Access will be controlled/granted by the Project Manager.
- Information/data stored in STELLAR will be available at least during the duration of the action with an extension according to SESAR 3 JU rules/policies. Access will be controlled/granted by the SESAR 3 JU after confirmation from the Project Manager.
- Information/data stored in the EU participation portal will be available at least during the duration of the action with an extension according to EU rules/policies. Access will be controlled/granted by the rules applicable to the EU participation portal and assigned roles there.
- The open results that are deposited in the Zenodo repository will be available for at least 5 years after the conclusion of the project.

2.2.3 Metadata

Metadata will be retrievable by their identifier using a standardised communication protocol. The open results that are deposited in the Zenodo repository will be available at least 5 years after the conclusion of the project. According to Zenodo's general policies, "items will be retained for the lifetime of the repository. This is currently the lifetime of the host laboratory CERN (European Organization for Nuclear Research), which currently has an experimental programme defined for the next 20 years at least."

No specific software will be needed to access or read the data, or it will be included in the repository (e.g. in open-source code).

2.3 Making data interoperable

Data produced by SATERA will be interoperable because:

- Draft and final versions of the deliverables and documents and files are interoperable since they will be files for regular and standard use (i.e. MS Office files, ZIP and PDF files).
- Datasets produced in the validation exercises are mostly interoperable because they will use already existing standards (e.g., ASTERIX categories for surveillance data or .mat files for data generated in MATLAB).

The vocabulary used in the SATERA will follow the different reference documents of the program, including the ATM information reference model (AIRM), the Information Service Reference Model (ISRM), the European ATM Master Plan and the European ATM Architecture (EATMA) repository.

2.4 Increase data re-use

SATERA will make publicly available all the deliverables declared as public in the GA and made publicly available as soon as they are approved by SESAR 3 JU. These documents will be licensed under Creative Commons Attribution-ShareAlike 4.0 International (CC BY-SA 4.0). No other restrictions for re-usage by third parties than the ones imposed by this license are envisaged.

SATERA will make publicly accessible datasets and processing algorithms supporting publishable scientific results after the publication of the corresponding paper. These documents will be licensed for scientific purposes under Creative Commons Attribution-ShareAlike 4.0 International (CC BY-SA 4.0). No other restrictions for re-usage by third parties than the ones imposed by this license are envisaged.

No embargo will be applied to public deliverables or data.

Regarding access to project results published in scientific journals or conference proceedings, SATERA will do its best to ensure the widest access by publishing them with gold open access. Those results that cannot be published with golden access will be published with green access with the shortest embargo period possible. Golden access papers will be immediately accessible through the publisher's digital library and will be also made available by the authors in Zenodo and in other institutional

repositories. Author's versions of the green access papers will be stored in Zenodo and other institutional repositories.

3 Other research outputs

Other data produced by the project encompass:

- **Source codes:** the code developed by the project will be made available in public repositories along with supporting material (user manuals, readme files or similar documents) unless they are affected by IPR policies set out in the Communication, Dissemination and Exploitation plan of SATERA.
- **Personal data gathered to manage the project team, coordinate at all levels and set up and organize meetings**: in accordance with the GA, the beneficiaries must process personal data under the Agreement in compliance with the applicable EU, international and national law on data protection, in particular, Regulation 2016/679 17.
- **Data** which are considered **out of the scope of the DMP**:
    - Project emails or other communications (e.g., chats in TEAMS).
    - Data related to the GA and included in the EU participation portal or STELLAR.
    - Data uploaded in the EU participation portal to fill the continuous reporting on milestones, risks, publications, Dissemination and communication, IPRs innovation.
    - Data produced to handle Risks/Issues & Opportunities (RIOs), actions, changes, milestones, and other artefacts (excluding deliverables) included in STELLAR to coordinate the project.

4 Allocation of resources

Regarding personnel costs, most of the effort needed to make SATERA data FAIR has been accounted for in the overall effort of each project WP.

Specific effort has been allocated to WP8 to execute data management activities. Costs associated with open access to research data (e.g., website hosting and gold access fees) can be claimed as eligible costs of any Horizon Europe grant and SATERA has allocated resources to this purpose in its budget. The hosting of data in Zenodo is free of charge.

The responsibilities for making the data accessible have been allocated to the WP leads coordinated by the Project Manager.

5 Data security

For deliverables and other data stored in STELLAR and EU participation portal, the responsibility for securing them lies with the by SESAR 3 JU and European Commission (EC), respectively, in line with the applicable data security measures according to Digital European Sky (DES) policies.

For data stored in TEAMS or beneficiaries' platforms, regular backups shall be performed on data storage servers to prevent unintentional data loss.

Regarding the data stored in Zenodo, "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 to tape on a nightly basis" (Zenodo general policies v1.0, available at https://about.zenodo.org/policies/).

6 Ethics

No ethical issues have been identified for SATERA having an impact on data sharing.

7 Other issues

SATERA will not make use of procedures for data management other than those set out in this document.