**Project[[1]](#footnote-1) Number:** 872735

**Project Acronym:** AERAS

**Project title:** A CybEr range tRaining platform for medicAl organisations   
and systems Security

**Periodic Technical Report**

**Part B**

**Period covered by the report**: from 01/06/2023 to 31/05/2025

**Periodic report:** 2nd

# 1. Explanation of the work carried out by the beneficiaries and Overview of the progress

# The AERAS project aimed at developing a realistic and rapidly adjustable cyber range platform for systems and organisations tailored for the critical healthcare sector, to effectively prepare stakeholders with different types of responsibility and levels of expertise in defending high-risk, critical cyber-systems and organizations against advanced, known and new cyber-attacks, and reduce their security risks.

# The developed platform, based on the open-source solution KYPO, enable the creation nad execution of realistic cybersecurity training programmes over different modalities, using virtual replica of the real working environments (Cyber Ranges) and exploiting traditional methodologies like questionnaires or quizzes.

# In particular, the project designed and developed a complete approach to drive the trainers in the definition of complete cyber range training programmes. The core of the approach is focused on the definition and exploitation of two different categories of models: Cyber Range Security Assurance (CRSA) models, specifying potential cyber-attacks, the security mechanisms used against them, and the methods for assessing their effectiveness, and Cyber Range Simulation and Training (CRST), that includes all the information related to the developed training programs.

# The models approach has been designed to be as general as possible to be able to apply the concepts included in them to the actual cyber range environment of selection. It is important to note that the AERAS work has been organized in two phases: first, a throughout analysis has been undertaken to be able to understand the actual cybersecurity training trends (WP2) and how this trend can be formalized in models, ready to be exploited in a real environment (WP3). Then, after the COVID outbreak that froze the research activities and after several changes in the Consortium, the team analysed the actual solution available in the market selecting KYPO as the basis of our reference architecture and adapting and enhancing it to the AERAS needs (WP4). In particular, the translation of the CRSA and CRST models has been taken in great consideration. Their intrinsic general definition allowed the team to populate specific KYPO models and create training programme, tailored to the context analyses we undertaken (D3.3).

# The AERAS approach, described in the checklist included in D4.2, provides guidelines for the analysis of the applying contexts, the definition and the population of the two models, the administering of the exercise through the platform, the analysis of the actual results of the training, and the adaptation of the training itself to new threats or pilots’ needs.

# The technical aspect of the platform has been investigated in WP4, and the final version is included in D4.3. Then, WP5 examined all the aspects related to the integration and deployment of the AERAS platform, including the great adaptation work done to the KYPO source code (D5.4), and managed the validation activities in the pilots sites.

# Furthermore, the AERAS solution includes also the definition of the RiskFactor, a methodology that can be applied to any kind of context allowing the calculation of a single index that evaluates the overall cybersecurity posture of the Organization. Following the AERAS checklist, the RiskFactor is calculated before and after the training sessions, to evaluate the effectiveness of the approach in terms of an improvement of the overall cybersecurity protection. The RiskFactor is also a useful method for the trainers to identify new and upraising threats that can be subject to an adaptation of the training programme.

# The AERAS solution has been delivered at TRL-7 and validated through two different pilots in the healthcare sector: (i) a hospital medical systems pilot; and (ii) a public health systems pilot. The validation test has been administered in the month of May in parallel in both pilots with good acceptance results.

# 1.1 Objectives

The AERAS project defined in the DoA the following objectives to frame and design the cybersecurity training infrastructure object of the work. Each objective has been associated to a set of KPIs, each of them linked to a WP of reference, defined to evaluate the advancement of the project.

Furthermore, for each KPI an achievement percentage has been provided. The percentage has been evaluated upon validation of the work done by the partners and internal discussions during the calls. The provided percentages are mostly linked to the achievements of the respective WP and the activities done by secondees within it.

The team has faced several problems due to the long COVID break, and the several changes in the composition of the Consortium that has resulted in a re-consideration of the overall project objectives. In particular, the team focused on delivering an integrated approach that can help organization in the healthcare sector to analyse their cybersecurity posture, apply a model-based approach to the training program definition, and execute them in a realistic environment as the open source KYPO platform. This has seen a shifting of the work to the definition of the approach and the general models, instead on focusing on the generation of several training programmes and CRSA/CRST models has planned in the DoA. However, despite the different effort allocation within the objectives, the overall results have been considered satisfying in the validation since the approach offered can be extended and applied in different contexts and basing on several reference architectures.

The validation, being applied in two healthcare organizations, has been influenced also by the overall working commitments of the trainees, that, in the particular Greece situation, are characterized of high working loads. The test has been administered to the maximum possible audience we could summon in the pilots, trying to optimize the required introduction organizing an open seminar, followed by training sessions.

**Objective 1**

*Develop Cyber Range Security Assurance models (CRSA models) to drive the generation of Cyber Range Simulation and Training (CRST) programmes*

* **KPI-1:** Deliver a language and an editor enabling specification of CRSA models **[WP3]** – **100%**
* **KPI-2**: Develop at least 10 model (fragments) to cover threats (at least 5) and security mechanisms (at least 3 per threat) for at least 4 critical properties (confidentiality, integrity, availability, privacy) **[WP3]** – **70%**
* **KPI-3:** Deliver at least 4 CSLA templates to cover the basic properties of confidentiality, integrity, availability and privacy, which can be instantiated to support the pilots **[WP3]** – **70%**
* **KPI-4:** Deliver at least 4 CRST programmes to cover the two pilots and two different user types for each of those **[WP3]** – **70%**

**Objective 2**

*Develop novel hybrid cyber security risk analysis models, which combine traditional static cyber security risk analysis principles and standards with continuous risk estimates. These estimates are informed from simulation and the continuous real-time multi-layer monitoring of cyber-systems and trainees*

* **KPI-5:** Delivery of at least 5 hybrid cyber-security risk analysis models, covering testing, static analysis, inspection, monitoring, and simulation-based analysis, and capable of providing real-time risk estimates for all types of risks and security mechanisms identified in the pilots **[WP3]** – **70%**
* **KPI-6:** Evaluate the effect of the use of hybrid cyber- security risk analysis models for the timely adaptation of risk analysis, with new outputs for new required controls produced within minutes of new information becoming available **[WP3/WP4]** – **100%**

**Objective 3**

*Develop mechanisms to support the adaptation of cyber range simulation and training programmes, via feedback received from multiple sources, including multi-layer system, trainee and programme performance monitoring, and CSLAs monitoring.*

* **KPI-7:** Delivery of the monitoring and adaptation mechanisms of CRSA models and associated Cyber Range programmes **[WP4]** – **100%**
* **KPI-8:** Delivery of real-time monitoring mechanisms to support the pilots. The mechanisms should cover all monitorable security mechanisms, security risks and trainee actions defined in the CRSA and models and CRST programmes developed for the pilots **[WP4]** – **100%**
* **KPI-9:** Demonstrate at least 6 sets of adaptations, covering all feedback loops from CRST programme performance, CSLA and Cyber-System monitors (one for each of the monitored layer**) [WP4]** – 5**0%**

**Objective 4**

*Develop capabilities required for the delivery of effective cyber training, namely emulation, simulation, security assurance assessment, and visualisation capabilities.*

* **KPI-10:** Delivery of mechanisms enabling the emulation and simulation of all key types of cyber system components, including external devices, web servers, data base servers, security servers, event busses, operating systems, trusted platform modules, and network components **[WP4]** – **100%**
* **KPI-11:** Delivery of mechanisms enabling the assessment of the emulated and simulated component’s security assurance status and the actions performed on them by the trainees **[WP4]** – **70%**
* **KPI-12:** Delivery of visualisation tools covering the state of the simulated/emulated cyber systems; the attacks upon them; the effects of user actions; comparative performance measures and the capability to zoom in and out on parts of the system and the events related to them **[WP4]** – **70%**

**Objective 5**

*To integrate capabilities developed under Obj. 1-4 into a common platform that delivers realistic and highly adjustable cyber training, offering hands-on experience against cyber-attacks, and supporting decision making in employing different mixtures of security mechanisms to combat risks and to demonstrate and validate the use of the AERAS platform for realistic and highly adjustable cyber training in the critical healthcare sector using two separate pilots based on real systems at TRL 7 (Demonstrator in pilots' environment)*

* **KPI-13:** Delivery of an integrated cyber range training platform, with capabilities described in Objectives 1- 4, at TRL7 **[WP5]** – **90%**
* **KPI-14:** Delivery, demonstration and evaluation of the integrated solution to each of the two pilot environments **[WP5]** – **100%**
* **KPI-15:** Validation across 2 pilots, involving a total of 640 hours of training (20 participants x 16 hours x 2 pilots) **[WP5]** – 7**0%**

**Objective 6**

*To ensure the dissemination and communication of the project’s results and the uptake of the AERAS innovation to organisations in critical domains, and cyber security stakeholders.*

* **KPI-16:** Achieve the project’s dissemination targets **[WP6]**
* **KPI-17:** Achieve the project’s communication targets **[WP6]**

**1.2 Explanation of the work carried per WP**

1.2.1 Work Package 1

This WP has been responsible of the coordination of project activities, communication with European Commission, project reporting, and risk management. The team reported about the issues in the secondments plan that have been caused by the pandemic outbreak, the changes in the Consortium, and the amendments that has been submitted and accepted.

Furthermore, a set of contingency actions has been proposed to cope with the delays in the secondments’ implementation, and the cold start of the activities after the COVID-19 lock down. A request for extension of the project has been submitted and approved allowing the rescheduling of secondments, WPs and deliverables deadlines.

Finally, the MidTerm meeting has been organized in Milan in January 2023, as reported in D1.4.

**Submitted Deliverables**

* **D1.1 “Project Quality Plan”** - Submitted 29/02/2020
* **D1.2 “Progress Report Year 1”** - Submitted 15/02/2023
* **D1.3 "Progress Report Year 3”** – Submitted 15/06/2025
* **D1.4 “Midterm Meeting”** – Submitted 27/02/2023

**Contribution of Partners**

All partners contributed to WP1 deliverables.

1.2.2 Work package 2

# The work has been focused respectively on Task 2.1 and 2.2, and on Tasks 2.3 and 2.4.

# Within Tasks 2.1 and 2.2, the secondments have been worked on the following points:

# Making and administering a Survey – The first part of the survey is the interviews with doctors, and the second part is a questionnaire for doctor, nurses, IT experts, Administrative Staff.

# Getting input from pilots about their needs in terms of cybersecurity training;

# Study cybersecurity standards and certification that could be relevant to AERAS training models.

# The results of the analysis of the survey have been described, indicating a good awareness of interviewees in cybersecurity issues, but a lack of training activities. All the results are included in D2.1.

# Within Tasks 2.3 and 2.4, the secondments work was focused on:

# Study of technological landscape and AERAS novelty​ and of an initial specification of the AERAS platform technical requirements for each platform's component;

# Discussing the initial version of the reference architecture for the AERAS platform. Sharing responsibilities of leading the development of each component between the partners. ​ Definition of each component of the architecture. Discussion of the candidate technologies that can be used to build the AERAS cyber range platform. Understanding the dataflow and the dependency between the component of AERAS platform.

# Selection of the AERAS reference architectures after the analysis of the technical and training requirements. The WP2 managed the selection of the KYPO open source framework as AERAS reference architecture, over which the other WPs will base the development work.

# The platforms requirements and a comprehensive technology analysis is reported in D2.2. The initial architecture of the AERAS platform is described in D2.3.

# Submitted Deliverables

* **D2.1. “Healthcare Pilots & Cyber Range Training Requirements Analysis Report” -** Submitted on 03/03/2023.
* **D2.2. “Platform Requirements and Technology Analysis Report” -** Submitted on 12/04/2023.
* **D2.3 “AERAS Platform Initial Reference Architecture” –** Submitted on 31/05/2024

# Contributing Secondments

1. **Evangelos Floros (PAGNI)** - **01/10/2022 to 31/05/2023 (not fully reported in 1st report** **– UMIL, Milan, Italy** – 8PM on WP2, Task 2.1, 2.2, 2.3 and 2.4. Gathering Pilot's (PAGNI) platform requirements, Interconnections between different entities in the Region, use case Pilot options, Getting familiar with the technical partners technologies.
2. **Fulvio Frati (UMIL) - 06/02/2023 TO 06/06/2023 - STS-Cy, Nicosia, Cyprus, 0.13PM** on WP2 Task 2.2, working on the finalization of D2.2, contributing to the collection and elicitation of platform technical requirements, and Task 2.4, laying the basis of the final platform architecture and the initial steps of D2.3.

# 1.2.3 Work package 3

# The WP3 work involved the three work packages’ tasks. Within T3.1, the secondee focused on the definition of a language to support the development of CRSA models and CRST programmes, through the following steps:

# Language definition to support the development of CRSA models

# Language definition to support the development of CRSA-driven CRST programmes

# The task receives inputs from previous research experience (like the work done in H2020 project CUMULUS), from the project requirements collected in WP2, and analyzing existing security standards like MITRE’s ATT&CK and STRIDE.

# Within T3.2, the secondees started studying the development of CRSA models for both pilots, and, consequently, on the development of CRSA-driven CRST programmes. This task will exploit the work done in T3.2 and will provide output to WP3, WP4, and WP5 that extensively use CRSA models and CRST programmes.

# Furthermore, T3.3 focused on the development of means to enable basic forms of analysis and determine the impact that certain changes in specific parts of the CRSA model will have on other parts of the CRSA model and means to support completeness and consistency checks of the entire specification of the CRSA models/programmes when changes occur in their components. The task will receive inputs from the other tasks, and providing outputs to WP3, WP4, and WP5. Finally, T3.4 worked on the initial specification of the hybrid cyber security risk analysis models to support different types of hybrid approaches for various security assessments. It takes input from T3.1 about the language to support the development of the models, and T3.2 for the specification of CRSA models and CRST programmes to investigate the soundness of the hybrid models. Outputs will be provided to all technical WPs. The task overcome also the important work of preparing the actual CRSA and CRST models and apply them to the final KYPO environment, ready to be administered to trainees.

# Submitted Deliverables

* **D3.1. “CRSA Models and CRSA-driven Cyber Range programme specification language” -** Submitted on 31/05/2024.
* **D3.2. “AERAS Models and CRSA-driven Cyber Range programme V1” -** Submitted on 15/01/2025.
* **D3.3 “AERAS Models and CRSA-driven Cyber Range programme V2” –** Submitted on 31/05/2025

# Contributing Secondments

1. **Dimitrios Plachouris (UPAT) - 22/01/2023 - 22/08/2023 – to AEGIS, Braunschweig, Germany** – 2.7 PM - Task 3.1, 3.2, 3.3 and 3.4. CRSA language definition and tool support
2. **Konstantinos Panousis (EAIN) – 26/02/2024 – 25/02/2025 – to PAGNI, Heraklion, Greece** – 12PM - Task 3.1, 3.2, and 3.3. CRSA language definition and tool support, definition of CRST models, population of models into final platform. Worked on deliverable D3.1 and D3.3
3. **Angelos Afxentiou (EAIN) – 04/03/2024 – 02/07/2024 – to PAGNI, Heraklion, Greece** – 3.97PM - Task 3.1, 3.2, and 3.3. CRSA language definition and tool support, definition of CRST models, worked on D3.1 and D3.3
4. **Marinos Raimondou (EAIN) – 04/03/2024 – 04/06/2024 – to PAGNI, Heraklion, Greece** – 3.03PM - Task 3.1, 3.2, and 3.3. CRSA language definition and tool support, definition of CRST models, worked on D3.1 and D3.3
5. **Zois Nearchou (TRID) – 26/03/2024 – 16/06/2024 / 26/06/2024 – 02/04/2025 – to UPAT, Patras, Greece –** 12PM - Task 3.1, 3.2, 3.3 and 3.4. CRSA language definition and tool support, definition of CRST models, population of models into final platform. Worked on deliverable D3.2 and D3.3
6. **Stelios Christophides (LIBRA) – 01/08/2024 – 31/05/2025 – to CUT, Limassol, Cyprus** – 10 PM - Task 3.1, 3.2, and 3.3. CRSA/CRST language definition and tool support, definition of CRST models, worked on D3.3.
7. **Nikos Chrysostomou (LIBRA) – 01/08/2024 – 31/05/2025 – to CUT, Limassol, Cyprus** – 10 PM - Task 3.1, 3.2, and 3.3. CRSA/CRST language definition and tool support, definition of CRST models, worked on D3.3.
8. **Nastasia Michael (LIBRA) – 01/08/2024 – 31/05/2025 – to CUT, Limassol, Cyprus** – 10 PM - Task 3.1, 3.2, and 3.3. CRSA/CRST language definition and tool support, definition of CRST models, worked on D3.3.
9. **Georgia Christofidou (LIBRA) – 02/12/2024 – 31/05/2025 – to CUT, Limassol, Cyprus** – 6 PM – Task 3.1, 3.2, and 3.3. CRSA/CRST language definition and tool support, definition of CRST models, worked on D3.3.
10. **Angelos Afxentiou (EAIN) – 03/08/2024 – 02/09/2024 – to LIBRA, Athens, Greece** – 1PM – Validation of CRSA/CRST models
11. **Loukas Papadoulas (EAIN) – 01/08/2024 – 31/05/2025 – to LIBRA, Athens, Greece** – 10PM – CRSA/CRST language definition and tool support, definition of CRST models, worked on D3.3.
12. **Katerina Christophidou (CUT) – 28/02/2025 – 27/05/2025 – to LIBRA, Athens, Greece** – 3PM - CRSA/CRST language definition and tool support, definition of CRST models, worked on D3.3
13. **Panagiotis Archontidis (CUT) – 02/09/2024 – 31/05/2025 – to LIBRA, Athens, Greece –** 9PM – CRSA/CRST language definition and tool support, definition of CRST models, worked on D3.3.

# 1.2.4 Work package 4

# The work done in WP4 has been mainly focused on the following points:

# Specification of tools and technologies to develop the AERAS platform components

# Familiarization and testing of open-source technologies for the development AERAS Emulation, Simulation and Visualization Components (QEMU, Open Nebula, Open Stack, Docker);

# Study of the design of a user-friendly Cyber range training platform

# Literature review on existing cyber range training platforms for usable and user-friendly visualization tools.

* + Familiarization with cybersecurity metaphors – visualization of the attacks – for better user experience
  + Selection of the AERAS reference architecture

# Design the AERAS platform architecture

# Installation of the candidate reference architecture (KYPO) to extend with the support to CRSA/CRST models.

# Testing KYPO cyber range training platform to identify features that could be adapted and redesigned for the AERAS solution.

# Adaptation of the KYPO open-source framework to be installed in pilots’ environments and with respect to AERAS technical requirements

# Adaptation of the visualization interface

# Creation of sandboxes with respect to CRST models

# Development of specific drivers to adapt to the newer version of the OpenStack server

# Definition of the AERAS checklist for the risk evaluation and adaptation

# Formalization and application of the RiskFactor procedure

# Application of the RiskFactor methodology for the adaptation of training programmes

# Submitted Deliverables

* **D4.1 “AERAS Cyber Range Tools - V1”** - Submitted on 22/08/2024.
* **D4.2 “AERAS Monitoring, Assessment and Adaptation mechanisms - V1”** - Submitted on 31/05/2024.
* **D4.3 “AERAS Cyber Range Tools - V2”** - Submitted on 15/06/2025.
* **D4.4 “AERAS Monitoring, Assessment and Adaptation mechanisms - V2”** - Submitted on 15/06/2025.

# Contributing Secondments

1. **Georgiana Patricia Darau (AEGIS) – 04/06/2023 – 30/06/2023 / 30/08/2023 – 10/10/2023 – to TSI, Chania, Greece** – 2.27PM - Task 4.2 Visualisation Tools: Collaborated with the consortium to evaluate the work for WP4 and created preliminary research plan to be carried out for gathering the end users' requirements in terms of the user interface's demand for visualization. It is planned to undertake a needs assessment research and collect feedback from healthcare professionals to develop the User Interface in accordance with the requirements of various end-user roles, including those of doctors, nurses, administrative staff, management, and security specialists. Contributed to D4.1
2. **Panagiotis Antoniou (AEGIS) – 15/06/2023 – 05/07/2023 / 17/07/2023 – 25/10/2023 – to CUT, Limassol, Greece** – 4PM – Task 4.1,4.2: worked on the analysis of state of the art in cyber ranges infrastructure for the selection of the reference architecture. Contributed to D4.1
3. **Ioannis Panagiotou (CUT) – 05/04/2024 – 04/07/2024 – to PAGNI, Heraklion, Greece** – 3PM – Task 4.1, 4.2: worked on the analysis of state of the art in cyber ranges infrastructure for the selection of the reference architecture. Contributed to D4.1
4. **Theodoros Christophides (CUT) – 03/07/2024 – 02/09/2024 – to PAGNI, Heraklion, Greece** – 3PM – Task 4.1, 4.2: worked on the study of the use of the selected reference architecture. Contributed to D4.1
5. **Fulvio Frati (UMIL) – 22/01/2024 – 21/05/2024 – to AEGIS, Braunschweig, Germany** – 4PM – Task 4.3, 4.4: definition and application of the AREAS checklist for risk evaluation and training adaptation. Contributed to D4.2 and D4.4.
6. **Konstantinos Papadamou (TRID) – 26/03/2024 – 30/06/2024 / 11/07/2024 – 30/10/2024 / 18/11/2024 – 22/04/2025 – to UPAT, Patras, Greece** – 12PM – worked on Task 4.1 and 4.2 on the adaptation of the reference architecture to the AERAS technical requirements. Managed the overall implementation work. Contributed to D4.3.
7. **Nikolas Ioannou (TRID) – 26/03/2024 – 30/06/2024 / 11/07/2024 04/04/2025 – to UPAT, Patras, Greece** – 12PM – worked on Task 4.1 and 4.2 on the adaptation of the reference architecture to the AERAS technical requirements. Contributed to D4.3.
8. **Dimitrios Dounas (TRID) – 22/04/2024 – 21/04/2025 – to UPAT, Patras, Greece** – 12PM – worked on Task 4.1 and 4.2 on the adaptation of the reference architecture to the AERAS technical requirements. Contributed to D4.3.
9. **Ioanna Stamouli (UPAT) – 09/05/2024 – 08/10/2024 / 18/12/2024 – 17/05/2025 – to TRID, Limassol, Cyprus** – 10PM – worked on task 4.1 and 4.3: application and validation of pilot’s requirements to the adapted platform. Contributed to D4.3 and D4.4.
10. **Esftratios Syrmas (UPAT) – 09/05/2024 – 08/10/2024 / 20/01/2025 – 19/03/2025 – to TRID, Limassol, Cyprus** – 7PM – worked on task 4.1 and 4.3: application and validation of pilot’s requirements to the adapted platform. Contributed to D4.3 and D4.4.
11. **Panagiotis Archontidis (CUT) – 02/09/2024 – 31/05/2025 – to LIBRA, Athens, Greece –** 9PM – Worked on task 4.1 and 4.2 contributing to the implementation of AERAS technical requirements. Contributed to D4.3.
12. **Nastasia Michael (LIBRA) – 01/08/2024 – 31/05/2025 – to CUT, Limassol, Cyprus** – 10 PM – Worked on task 4.1 and 4.2 contributing to the implementation of Technical requirement with respect to AERAS checklist. Contributed to D4.3 and D4.4.
13. **Theodoros Christophides** (CUT) – 28/02/2025 – 27/05/2025 – to LIBRA, Athens, Greece – 3PM – Worked on task 4.1 and 4.2 contributing to the implementation of AERAS technical requirements and the application to the AERAS checklist. Contributed to D4.3 and D4.4.

1.2.5 Work package 5

The work in WP5 has been focused on the integration of all the architectural components that have been developed in WP3 and WP4, as well as the deployment of the AERAS platform in the pilots’ environments, and in the administering of the validation tests.

# Definition and setup of the integration environment that has been utilized for the Continuous Integration (CI) and Continuous Development (CD) of all the components of the AERAS Platform.

# Implementation of AERAS-specific drivers for KYPO and OpenStack to allow the adaptation of the platform to the project requirements and the newer version of Openstack.

# Definition and implementation of validation tests and training programmes.

# Administering of the validation tests and training programmes to the selected pilots’ personnel.

# Collection and analysis of validation tests results.

# The work has been of paramount importance in the last months of the project due to the high load of work needed to deploy the platform at pilots’ site, and to administer the validation tests to healthcare personnel, considering intrinsic personnel work duties. The validation test has seen the participation of 18 participants (53%) from UPAT and 16 participants (47%) from PAGNI. The results of the testing campaign have been reported in D5.5.

# Submitted Deliverables

# D5.1 “Initial Prototype of integrated AERAS platform” – Submitted on 21/08/2024

# D5.2 “AERAS Evaluation Framework and Pilot Set Up Guidelines” – Submitted on 31/08/2024

# D5.3 “AERAS initial prototype pilot validation report” – Submitted on 15/01/2025

# D5.4 “Final Prototype of integrated AERAS platform” – Submitted on 15/06/2025

# D5.5 “AERAS final prototype pilot validation report” – Submitted on 15/06/2025

# D5.6 “Final AERAS evaluation report” – Submitted on 15/06/2025

# Contributing Secondments

1. **Konstantinos Kalais (CUT) – 04/10/2022 – 03/10/2023 – to PAGNI, Heraklion, Greece –** 12PM – State of the art analysis on the definition of the AERAS integrated platform. Contributed to D5.1 and D5.2
2. **Esftratios Syrmas (UPAT) – 17/04/2023 – 16/09/2023 – to AEGIS, Braunschweig, Germany –** 3.5 PM  
   **09/05/2024 – 08/10/2024 / 20/01/2025 – 19/03/2025 – to TRID, Limassol, Cyprus – 7PM** -State of the art analysis on the definition of the AERAS integrated platform with respect to pilots’ deployment requirements. Contributed to D5.1 and D5.2
3. **Konstantinos Papadamou (TRID) – 26/03/2024 – 30/06/2024 / 11/07/2024 – 30/10/2024 / 18/11/2024 – 22/04/2025 – to UPAT, Patras, Greece** – 12PM – In collaboration with WP4, he managed the integration and deployment of the AERAS platform, developing specific software drivers for the execution of the platform in the Openstack virtual environment. Contributed to D5.1 and D5.3.
4. **Nikolas Ioannou (TRID) – 26/03/2024 – 30/06/2024 / 11/07/2024 04/04/2025 – to UPAT, Patras, Greece** – 12PM – In collaboration with WP4, he contribution to the deployment of the integrated environment. Contributed to D5.1 and D5.3.
5. **Dimitrios Dounas (TRID) – 22/04/2024 – 21/04/2025 – to UPAT, Patras, Greece** – 12PM – In collaboration with WP4, he contribution to the deployment of the integrated environment. Contributed to D5.1 and D5.3.
6. **Ioanna Stamouli (UPAT) – 09/05/2024 – 08/10/2024 / 18/12/2024 – 17/05/2025 – to TRID, Limassol, Cyprus** – 10PM – In collaboration with WP4, she contributed to the verification of AERAS platform deployment with respect to pilots’ technical requirements.
7. **Nikoleta Vryoni (TRID) – 04/07/2024 – 03/01/2025 – to UPAT, Patras, Greece** – 6PM – In collaboration with WP4, she contribution to the deployment of the integrated environment. Contributed to D5.1 and D5.4.
8. **Kyriakos Georgiou (CUT) – 02/12/2024 – 01/03/2025 – to LIBRA, Athens, Greece –** 3PM – Contributed in the final stage of the deployment, working on D5.3.
9. **Theodoros Christophides (CUT) – 28/02/2025 – 27/05/2025 – to LIBRA, Athens, Greece –** 3PM – Contributed in the organization of the final validation, worked on D5.4, D5.5 and D5.6.
10. **Manolis Minaides (TRID) – 10/10/2024 – 09/04/2025 – to UPAT, Patras, Greece** – 6PM – In collaboration with WP4, he contribution to the deployment of the integrated environment. Contributed to D5.1 and D5.3.
11. **Katerina Christophidou (CUT) – 28/02/2025 – 27/05/2025 – to LIBRA, Athens, Greece –** 3PM – Contributed in the organization of the final validation, worked on D5.4, D5.5 and D5.6.
12. **Sotirios Chatzis (CUT) – 13/12/2024 – 12/01/2025 – to LIBRA, Athens, Greece –** 1PM – Contributed in the organization of the final validation, worked on D5.5 and D5.6.
13. **Maria Papadouri (CUT) – 28/02/2025 – 27/05/2025 – to LIBRA, Athens, Greece –** 3PM – Contributed in the organization of the final validation, worked on D5.5 and D5.6.

**1.3 Impact**

During the execution of the project, the Consortium considered valid the impact expected and provided in the DoA and worked towards it.

In particular, the expected impact has been organized in the following points:

1. *Enhancing the potential and future career perspectives of the staff members*

Secondees reported a strong collaboration with the hosting organizations and a good exchange of knowledge. Researchers from the Universities allowed private companies to raise their awareness in state-of-the-art technologies, while researchers coming from SMEs of the Consortium bring to Universities and pilots knowledge about the collection of requirements, specific of the healthcare sector, and a good understanding of the technologies over which the project infrastructure will be developed. It is important to note how the secondees from the partners that joined the Consortium in the last two years strongly committed into the success of the project itself, introducing new skills and knowledge that were missing and actively participating in research activities. The last two years have seen a high participation, and the work has been coordinated to achieve project goals.

1. *New and lasting research collaborations*

Discussion on future collaborations and common works and projects have been nurtured and promoted during the secondments periods. In particular, the Consortium worked on a joint research paper that has been published on the International Journal of Information Security, giving the opportunity to most of them to join the authorships.

1. *Self-sustainability of the partnership after the end of the project*

The project has recovered with a lot of effort after the COVID outbreaks and the big changes we had to face in the Consortium composition. However, poartners have gained knowledge on cybersecurity training based on cyber ranges that can be easily exploited in future collaborations. SMEs that participate to the project can include in their products portfolio new training-related services, exploiting the new technologies studied during the projects.

1. *Improving research and innovation potential within Europe and worldwide*

Even if the project starts in 2019 and the cybersecurity training has changed a lot in terms of training contents and tools, the use of cyber range is still a hot topic in the European landscape. The nature of the AERAS platform, based on the CRSA and CRST model, introduced a flexible approach that can be easily adopted in other contexts. The AERAS checklist, along with the RiskFactor methodology, can be considered and a good starting point for the definition of complete training programmes.

**2. Update of the plan for exploitation and dissemination of result (if applicable)**

The Consortium did not request change in the original dissemination plan.

For this reporting period, AERAS followed, with no significant changes or alterations, the dissemination and communication plan established in D6.1. The following table summarizes AERAS's Impact Awareness KPIs and provides the status of each metric. It is important to note how the multiple amendments and change in the project objectives have shifted the project focus on the deployment of the integrated framework. However, the Consortium stived in reaching dissemination KPIs as expected in the DOA. Several KPIs were already reached at the time of the previous report.

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| --- | --- | --- | --- |
| **Impact Awareness Metrics (KPI’s)** | | | |
| **KPI** | **Tool** | **Success Indicators** | **M66 Status** |
| **KPI-1**  **KPI-1B** | AERAS Website | ≥ 3.000 accesses | 11369 (last year of project) |
| ≥ 100 downloads | 225 |
| **KPI-2**  **KPI-2B** | AERAS on Social Media | ≥ 50 Announcements | > 100 |
| >300 followers | X: 61  Facebook: 68  LinkedIn: 192 |
| **KPI-3** | AERAS Regular newsletters | ≥8 newsletters | 8 |
| **KPI-4** | Brochure | ≥2.000 hard copies distribution in ≥ 10 events | 0 |
| **KPI-5** | Journal and Magazine Publications | ≥ 5 publications  ≥ 50 citations | 10 pub. 263 cit. |
| **KPI-6** | Conference & Workshop Publications | ≥10  ≥100 citations | 1 pub. |
| **KPI-7** | Special Issues in Scientific Journals | ≥1  >50 citations | 1 |
| **KPI-8** | Workshop Organisation | ≥2 workshops  ≥30 attendees (each) | 1 |
| **KPI-9** | Conference & Exhibition demos | ≥2 demos | 0 |
| **KPI-10** | Press Echoes | >1 | 0 |
| **KPI-11** | Newspapers | >1 | 0 |
| **KPI-12** | Public lectures and/or networking event for the general public | ≥ 2,  >5 attendees (each) | 2, >100 attendees |
| **KPI-13** | Public lecture and/or networking event for policy makers | ≥ 2,  >5 attendees (each) | 1  >50 |
| **KPI-14** | Marie Sklodowska-Curie open research days or Researchers’ nights | ≥ 2,  >5 attendees (each) | 0 |

**3. Update of the data management plan (if applicable)**

No Data Management plan is requested for the project.

**4. Follow-up of recommendations and comments from previous review(s) (if applicable)**

Already included in first project report.

**5. Deviations from Annex 1 and Annex 2 (if applicable)**

Major deviations on the plan has been reported in delay in the submission of deliverables, due in particular to the COVID outbreak and the change in the research plan due the Consortium re-organization that lead to a re-consideration of project objective.

The secondments plans has been re-organized taking into consideration the actual secondments the partners could effectively activate. In particular, UMIL, STS, and PAGNI reduced their quota to give the opportunity to new partners to activate the more secondments possible. This decision was a key point in the use of the majority of the budget, and for the fulfilling of research goals.

In order to keep the developing team closer to the pilots’ manager, after the approval of AMD-872735-20 and the inclusion of beneficiary TRID Trinomial Technologies Ltd (TRID), based in Cyprus, with the approval of the Coordinator, UPAT’s secondments have been redirected to TRID in Cyprus instead of AEGIS (Germany), as previously expected in the DoA.

# 5.1 Tasks

The major deviations in the plan has been reported in WP4, in particular due to the selection of the reference architecture (KYPO) and its integration with the Openstack virtual infrastructure. In fact, the version of Kypo available at the date of the developing wasn’t compatible with the last version available of Openstack. This has requested from the WP4 and WP5 team a lot of developing effort to solve the integration issues and allow the execution of training programmes.

The team succeeded in doing this, but introduced a considerable delay that has been reflected in the validation activities. To reduce time, WP5 team, along with all team leaders and secondees, organized an open webinar on May 22nd, 2025, where we presented to the general public and policy makers our solution. After the webinar, we summoned people from the pilots, introduced them to the platform, and started administering training programmes as platform validation.

Every deviation on the plan has been timely discussed with the Project Officer, requesting if needed extension on the submission of the project deliverables.

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| HISTORY OF CHANGES | | |
| VERSION | PUBLICATION DATE | CHANGE |
| 1.0 | 15.07.2015 | Initial version |
| 1.1 | 08.08.2016 | Corrections for MSCA. |
| 1.2 | 27.03.2017 | Modification of Part B for Research Infrastructures (RI) actions to include a table with the resources used to provide access to RI. |
| 2.1 (version of full template) | 19.12.2017 | Update of part B of the template to include explanations on adjustments to financial statements declared on previous periods. |

1. The term ‘project’ used in this template equates to an ‘action’ in certain other Horizon 2020 documentation [↑](#footnote-ref-1)