



D 11.2-A: Training material, courses and workshops Deployment catalogue

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Summary

This document provides an analysis of the training situation within the partnership at the beginning of the project with the training plan and actions planned, the training performed during the project and the training material developed during the project.

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Abbreviations

eDIANA	Embedded Systems for Energy Efficient Buildings
WP	Work Package

1. Introduction

The following phases have been followed in the development of the task 11.2 Education and Training:

1. Preparation phase: The first thing to perform at the beginning of the project was to analyze the task and define an action plan with clear training requirements. In this preparation phase the following actions were performed:
 - Analyze the task's goal
 - Survey of other projects training plans
 - Study the training and education plans of eDiana partners
 - Identify the main target stakeholders
 - Define the training requirements
 - Define the action plan
2. Analysis phase: The second phase consisted of analysing the current training situation with the partnership and training scope. For this purpose, a questionnaire was defined and partners were asked to fill it in. The goal of the questionnaire was twofold:
 - Assess the current training situation of each partner and
 - Update the training activities performed by each partner, also inquiring about any accessible material.
3. Training planning phase: The answers to the questionnaire have been used for:
 - Determining the training needs of eDIANA partners. And identifying already satisfied training needs: performed training.
 - Defining a training plan, emphasizing the training needs not yet satisfied.
4. Preparation of training material phase: prepare the material for the training needs not yet satisfied.

2. Preparation phase

The goal of this preparation phase was to analyze the situation to be able to suggest an action plan (that has lead to this deliverable) which was discussed with the rest of the partners involved in the task.

2.1 Context

The main objective of the WP-11 is to make stakeholders aware of the project. It has been achieved through the development and deployment of an awareness and dissemination plan which establishes messages, target audiences and dissemination means.

This WP includes also training as the most effective mean to disseminate concrete results to any kind of practitioner.

2.2 Task Description

This section summarizes the task by reviewing its definition, its subtasks, its goals and the expected results.

2.2.1 Definition

Task 11.2 Education and Training (Month 3 - Month 36)

Task type: Industrial Research

Leader: MU(3) Participants: UNIBO(2), IKERLAN(1), FAGOR(1), LABEIN(2), UOR(1).

The objective of this task is the analysis of the current training situation within the partnership and training scope, definition of a Training Strategy and Training Plan including a Training Programme.

A consequence of globalization of economy and companies operating at national and international level is the emergence of the need for a flexible and dynamic workforce with multiple skills to fit the required changes, and increase competitiveness and innovation. The result of this shift is a significant and increasing demand for re-skilled people, at all levels, to cope with the new ways of working together, of collaborating across borders and cultures, as well as the pace of change in business environments. The difference between the R&D success and the widespread application is one of the main aspects to be addressed. Therefore, new training methods addressing the increasing needs for competencies, transfer of new knowledge, and lifelong learning systems have been developed for researchers and key staff, including research managers and industrial executives (in particular for SMEs) and any potential users of the knowledge generated by the project.

2.2.2 Subtasks

- Analysis of the current training situation with the partnership and training scope.
- Definition of a training strategy and training plan including a training program and deployment of training courses.

2.2.3 Goals

The following training goals are extracted from the eDIANA project proposal. Taking the different training needs into account, it seems reasonable to articulate the training in three different axes: training for students/researchers, training for professionals and training for end users, where each of them should be addressed taking into account its specific requirements.

- To train different stakeholders (users, architects, technological providers, workers...), delivering **400 to 600 training** packs through different educational paths and channels.
- **End User Training**
 - eDIANA contributes to enhance the awareness, social acceptance and responsibility of European citizens and users towards sustainable and economic concepts and behavior (reducing personal energy usage) by providing them with real time data, user friendly decision support tools, education, training and guidelines.
- **Student/Researcher Training**
 - In particular, three universities, part of eDIANA consortium (UNIBO, UOR and MU) are using eDIANA results in the context of Computer Science and Telecommunication Engineering degrees and postgraduate lectures on the following specific aspects:
 - Theoretical foundations of modeling, identification and control, providing a wide review of modular and object oriented modeling techniques adopted throughout the project.
 - Simulation techniques for large scale, distributed and networked systems.
 - Communication protocols, dealing with all aspects of the eDIANA platform related to radio and wired communications.
 - Software engineering courses, on methods of software development for embedded systems, especially during the design phase, including Model Driven Engineering, product line engineering and early verification and validation of embedded systems.
- **Professional Training:**
 - To qualify different type of professionals (developers, technologists, integrators, etc.) to work with eDIANA Platform and develop new devices, applications and services on top of it.
 - In addition to the above, the teaching material have been also offered as industry courses through channels such as conferences or seminars.
 - Educating entrepreneurs.
- **Awareness Via Educational, Training Materials and Courses:**

- For students and professionals (architects, promoters, system providers, installers, users, etc.): Partners have disseminated their know-how via courses, lectures, poster sessions, etc.

2.2.4 Expected Result:

D11.2-A: Training material, courses and workshops deployment catalogue.

This deliverable and associated training material.

- **Lead Beneficiary:** MU
- **Nature:** Report
- **Dissemination Level:** Public
- **Delivery Date:** Month 36 (January 2012)

2.3 Survey of Other Projects Training (Plans)

With the aim delimiting the scope of this task, a survey, albeit small, of other project training plans has been performed. This served as a starting point and aid the development of the training plan of eDIANA.

2.3.1 Artemis JU Call 2008 Projects

Project description is available at: https://www.artemis-ju.eu/call_2008_projects

- **SYSMODEL:** <http://www.sysmodel.eu/Training.htm>

There is no example of training plan in any of them. Hence, a quick survey of other related projects is made, with the aim of finding examples and getting ideas.

2.3.2 Related Projects (see Page 19 of the eDIANA Proposal)

- **AMIGO:** <http://www.hitech-projects.com/euprojects/amigo/>
 - **Training Plan:** http://www.hitech-projects.com/euprojects/amigo/deliverables/amigo_d10.4_final.pdf
 - **Available Tutorials:** <http://www.hitech-projects.com/euprojects/amigo/tutorials.htm>
 - **Seminar/Workshop List**
- **MODELPLEX:** <http://modelplex.org/index.php>
 - **Training Material for the Modeling Community:** <http://www.eclipse.org/gmt/omcw/>
 - **Demos:** http://www.modelplex.org/index.php?option=com_remository&Itemid=79&func=select&id=62
- **MODELWARE:** <http://www.modelware-ist.org/>
 - Web is unavailable.

- **WITNESS:**
 - Not found.
- **POBICOS:** <http://www.ict-pobicos.eu/summary.htm>
 - Early to have one – Started on May 2008
- **TEAHA:**
 - Not found
- **EMEES:** <http://www.evaluate-energy-savings.eu/emeees/en/home/index.php>
 - No explicit training section
 - Reports/Publications available: <http://www.evaluate-energy-savings.eu/emeees/en/publications/reports.php>
- **BAREENERGY:** <http://www.barenergy.eu/>
 - No explicit training section
- **ENERGY:**
 - Not found
- **SMART-A:** <http://www.smart-a.org/>
 - No explicit training section
 - **Presentations:** <http://www.smart-a.org/index.php?page=event>
- **MOMENT:**
 - Not found.
- **SOCRATES:** <http://www.fp7-socrates.org/>
 - No explicit training section
 - **Publications:** <http://www.fp7-socrates.org/?q=node/10>
 - **Presentations:** <http://www.fp7-socrates.org/?q=node/25>
- **AMEC:**
 - Not found.
- **ESNA:** <http://www.sics.se/esna/>
 - No explicit training section.
 - **Publications:**
http://www.sics.se/esna/index.php?option=com_content&task=view&id=15&Itemid=36
- **GENESYS:** <http://genesys.sztaki.hu/welcome.html>
 - No explicit training section.
- **ADDRESS:** <http://www.addressfp7.org/>
 - No explicit training section.
 - **Publications:**
http://www.addressfp7.org/index.html?topic=config/progress_publications
- **PROSE:** <http://www.prose-project.eu/dotnetnuke/>
 - No explicit training section.

2.3.3 Conclusion

The only actual training plan that was found is the one that belongs to the **AMIGO Project** (http://www.hitech-projects.com/euprojects/amigo/deliverables/amigo_d10.4_final.pdf).

2.4 Training and/or Education Plans of eDIANA Partners

(From the Awareness & Dissemination Plan and Initial Results – Issued on 30 April 2009)

This section intends to summarize the training and education plans that were expressed by eDIANA partners on April 2009.

2.4.1 Papers and Publications – Target: Researchers/Students

PAPERS AND PUBLICATIONS				
Nº	Coordinating Organisation	Title	Category	Authors
1	MU	To be defined (About V&V in the energy sector)	PU	MU
2	UOR	To be defined (about sensor and actor or heterogeneous networks)	PU (Conference or workshop)	UOR
3	UNIBO	An Overview on Wireless Sensor Networks Technology and Evolution	IEEE Sensors Journal, special issue on Wireless Sensor Technologies	UNIBO
4	UNIBO	Demo Abstract: ZigBee-Based Platform for Energy Efficient Buildings	European Conference on Wireless Sensor Networks, EWSN	UNIBO, ST
5	UNIBO	An IEEE 802.15.4 Wireless Sensor Network for Energy Efficient Buildings	Tyrrenian Workshop	UNIBO
6	UNIBO	A ZigBee Smart Energy Implementation for Energy Efficient Buildings	IEEE 73rd Vehicular Technology Conference, VTC2011-Spring, 2011	UNIBO

2.4.2 Education and Training. Tutorials and Professional Sessions

- **MU:** Tutorial about V&V during embedded software development cycle. The tutorial addresses issues such as architecture modeling for V&V, V&V techniques and methods for different phases in the development, and illustrated with examples from the energy sector. The tutorial has been prepared and it is available. This tutorial will be used as part of the Verification and Validation course in the embedded system master.
 - Target: Researchers/Students/Developers
- **Ikerlan-Fagor:** iEI Integration Workshop eDiana developers was hold by Ikerlan and Fagor
 - Target: Researchers/Developers
- **LABEIN** prepared a local workshop for developers of eDiana. The intelligent algorithms for the Macro Cell level controller were the focus of the workshop.
 - Target: Developers
- **UOR** has prepared academic lectures and seminars in order to disseminate the project results, focusing especially on networking.
 - Target: Students/Researchers
- **University of Bologna:**
 - Roberto Verdone and Chiara Buratti hold a course on "Wireless Sensor Networks" at the University of Bologna. Is is an international master course for Telecommunications, Electronics and MASSET (Material and Sensor Systems for environmental technologies) Engineers, provided in English language.A window of this course was devoted to the eDIANA project: definition of the scenario, the platform, the communication protocols and technologies selected and numerical relats achieved through simulations and through experimentations made on the field.
 - Target: 20 students, coming form all over the world, participated to the course.
 - Chiara Buratti hold a tutorial on "The IEEE 802.15.4 standard: MAC and Topology aspects" during the COST2100/CONET/NEWCOM++ Training School on "Cooperating Objects and WSNs", hold in Bologna on May 10-12 2010. A part of the tutorial was devoted to case studies and to eDIOANA, in particular.
 - Target: Researchers/Students – Approx. 100 people were present.

- **ST:** Internal presentations and training in order to broadcast the project concepts to relevant STM design and application teams, in particular the teams involved in specifying next members of SPEAr family.
 - Target: Professionals

2.5 Main Target Stakeholders of eDIANA

(From the Awareness & Dissemination Plan and Initial Results – Issued on 30 April 2009)

This section summarizes the different stakeholders that are part of the eDIANA Project. Their training requirements need to be assessed and fulfilled.

- **Standardization bodies:** International standardization organizations such as: (CEN/Cenelec/ETSI/ IEEE, etc.) and national ones such as: AENOR, DIN, SFS, UNI, NEN, as they develop and establish product and/or process standards to be followed by platform producers and application developers.
- **Certification entities:** (EEPCA - Professional Association of the European Certification Bodies, EECC The European Certification Council, etc.) provide confidence to users that a certain element of the eDIANA Platform is produced and/or operated according to a defined set of practices or standards.
- **Embedded systems suppliers, installers and service providers for energy efficient buildings through national, European and international associations related with the technologies developed in the project.** (Such as: DMASS - Distributors' and Manufacturers' Association of Semiconductor Specialists; EDAA – European Design and Automation Association; ESA – European Software Association).
 - *Hardware producers:* providing the hardware components (from individual CPUs to servers, etc.) on which the software platform can run.
 - *Peripheral equipment producers:* providing all kind of devices that complement the basic functionality of the platform.
 - *Application developers:* producing systems that run on the platform infrastructure and address user needs.
 - *Content providers:* is an important complement especially in media-oriented platforms.
 - *Methodology/tool providers:* making available developing methodologies, environment and tools for application developers and content providers.
- **Training providers:** provide training to qualify developers and other professionals to work with the eDIANA Platform. Such as: Universities, RTD and devoted training organizations.

- **Local Authorities & National/Regional Public Bodies** are key players as policy makers, favorable legislative framework creation, public procurement, owners and promoters of their own buildings are also end users interested in cooperative working systems or applications. Such as: European Housing Ministries.
- **Architects' Associations.** Architects need to be provided with appropriate training, tools and guidelines for them to consider embedded systems for energy efficiency in new and retrofitted buildings.
- **Construction companies associations and related research associations** should be aware of the new technologies that will be installed in new and existing buildings. (Such as: FIEC, ENCORD, EUROACE, EUROCONSTRUCT, CIB, ECCREDI, etc.) .
- **Public and private real estate Promoters.** They can offer to their clients the advantage of the developed system therefore they should be informed about it and especially about new business models that could help to foster the adoption of the technologies.
- **Clients and users (citizens):** key actors interested in cooperative working systems or applications providing their perspectives in the formulation and assessment of the project results in aspects such as, design for all, adaptability for the future and value procurement through and new business models, such as Euroconsumers.
- **Network operators:** may act as a channel for offering and billing services and/or access devices to users. Such as: Eurelectric – Union of the electricity industry
- **Energy Management Agencies.** Regional and/or national energy agencies are promoting efficient and innovative building-related energy technologies in building normally fund projects regarding energy efficiency and integration of RES. Such as: OPET Network, IEA – International Energy Agency.
- Other related projects and platforms.

Nevertheless, not all stakeholders necessarily have specific training needs. The following table summarizes the stakeholders and suggests which require training.

eDIANA Stakeholders		
Stakeholder	Awareness	Training
Standardization Bodies		
Certification Entities		
Embedded Systems Suppliers, Installers and Service Providers for Energy Efficient Buildings	X	X

• Hardware Producers	X	
• Peripheral Equipment Producers	X	
• Application Developers	X	X
• Content Providers	?	?
• Methodology/Tool providers	X	X
Local Authorities & National/Regional Public Bodies	X	
Architects' Associations	X	X
Construction Companies Associations and Related Research Associations	X	X
Real Estate Promoters	X	
Clients and users (citizens)	X	X
Network operators	X	
Energy Management Agencies	X	

2.6 Training Requirements

This section intends to describe the different training requirements the stakeholders of eDIANA have. As stated before, the training needs are articulated around three axes: end user training, researcher/student training and professional training. Nevertheless, as the training needs of some of the stakeholders overlap, the training material for these three groups can be reused in different scenarios.

Apart from each stakeholders training needs, possible material and channels were suggested.

2.6.1 End User Training

One of eDIANA's goals is to enhance the awareness, social acceptance and responsibility of European citizens and users towards sustainable and economic concepts and behavior (reducing personal energy usage) by providing them with real time data, user friendly decision support tools, education, **training** and guidelines.

- **Training needs:** The main goal of eDIANA, in line with SP7, is to enable sustainable urban life through rationalization in the use of resources while increasing comfort in urban environments by means of embedded intelligence and integration technologies. Consequently, citizens, who are eDIANA's end users, play a pivotal role. To this end, citizens need to:

- Be convinced about the need to lead a sustainable lifestyle, in particular regarding energy consumption.
- Be aware about the economic advantages such a behavior brings.
- Know the advantages eDIANA provides.
- **Material:** Presentations/Tutorials
- **Channel:** Web

2.6.2 Researcher/Student Training

These two stakeholders have been grouped together, as they revolve around Universities and have common needs. However, there are differences.

The student training, albeit specific in a sense, is intended to give a general and commonly established background on the principles behind eDIANA. While some of the students will become researchers, others might become professionals and apply the training in industry.

Researchers, on the other hand, need cutting-edge knowledge on the topics on which eDIANA is built, with a particular emphasis on open challenges to which they can contribute.

2.6.2.1 Student Training

- **Training needs:** Universities part of eDIANA are providing graduate and post graduate lecturers in the following topics, which uses eDIANA results:
 - Theoretical foundations of modeling, identification and control, providing a wide review of modular and object oriented modeling techniques adopted throughout the project.
 - Simulation techniques for large scale, distributed and networked systems.
 - Communication protocols, dealing with all aspects of the eDIANA platform related to radio and wired communications.
 - Software engineering courses, on methods of software development for embedded systems, especially during the design phase, including Model Driven Engineering, product line engineering and early verification and validation of embedded systems
- **Material:** Lectures/Presentation/Tutorials
- **Channel:** Classroom, available on the Web?

2.6.2.2 Researcher Training

- **Training needs:** Researchers require a deeper knowledge of the challenges posed by and of the solutions developed in eDIANA.
- **Material:** Conference/Journal papers, Tutorials
- **Channel:** High impact conferences/journals, available on the Web?

2.6.3 Professional Training

If eDIANA is to be successful the different professionals are that may be linked with the platform need to be convinced of the advantages it brings. More precisely they need to be convinced that:

- Energy efficiency and optimizing overall energy consumption, production and storage are main issues. Buildings alone, which are the target of the eDIANA platform are responsible of more than 40% of the energy consumption in Europe.
- eDIANA delivers tools and means to increase awareness for rational use of energy; interoperation and cross-functional interoperation of embedded control systems will lead to higher energy efficiency.
- eDIANA provides architectures and communication platforms to enable the flexible and evolvable interoperation of systems, including sensors, actuators, information systems, control systems and commercial systems across multiple domains and multiple vendors and service providers, together with a standard HW and SW modeling framework and of development tools based on common industry driven metamodels.
- This eases the conception, development, validation and integration of new devices and services, thus reducing development effort and increasing business opportunities.
- The ecosystem surrounding the eDIANA platform will outlive beyond the end of the project. This is a key factor to enable wide adoption in the market and obtain business impact.

It is important to note that professionals have different needs and require information at different granularity levels. As case in point, a high level knowledge of the eDIANA platform suffices for architects, while service or application developers require in-depth comprehension of the underlying technical background.

Hence, professional training has been divided in two parts: a high-level training, directed to all professionals and developer training. Ideally, training would be organized in different modules, allowing different professionals to attend to the ones of particular interest to them.

2.6.3.1 High-level training

- **Training needs:** Architects, constructors, company and SME managers and the like, are not typically aware of modern technologies. Hence, the benefits of a model-driven platform like eDIANA should be detailed first. Particularly it is essential for managers and decision makers, as application of these technologies in real-world products requires an up-front investment in terms of at least developer training. Then an overview of the eDIANA platform

should be given, with an emphasis on its benefits and the business opportunities it provides.

- **Material:** Presentation/Tutorials
- **Channel:** Seminars, available on the Web?

2.6.3.2 Developer training

- **Training needs:** Developers require a deep knowledge of the new methods, tools and components provided by eDIANA, in order to make the platform grow. Unlike the previous case, practical knowledge is needed together with the theory.
- **Material:** Presentation/Tutorials/Demos.
- **Channel:** Seminars, available on the Web?

2.6.3.3 Example: Professional Training Required in the Scope of WP6 (Verification, Validation and Certification)

(From Evaluation of WP6 activities in the scope of WP11 (training))

This subsection provides an example the industrial partner needs that arise in the scope of WP6. It is divided in the three corresponding tasks in WP6, which could be easily translated into three or six training modules (depending on the decision if the manager/developer distinction is deemed necessary).

2.6.3.3a T6.1 eDIANA system of systems modelling for enabling V&V

The first activity should be an *introduction to the environment and tools to modelling the system*. A possible thematic covered could be:

- Papyrus Tutorial
- Overview to UML Profiles (stereotypes, tagged values and constraints)
- Specific profile: MARTE (Modelling and Analysis of Real-time and Embedded systems)
 - MARTE foundations
 - SubProfiles
- Overview of SysML.
- How develop/enhance a UML Profile (eDIANA concrete sample)
 - How to identify and isolate the MARTE Profile parts usable by eDIANA.
 - How to enhance the MARTE UML Profile to cover missing functionalities/requirements identified in eDIANA.

We assume that the learner has basic knowledge about UML.

Another activity should be focused to the *domain exploration for analyzable models - non-functional analysis domains for schedulability (performance and timing)*. This could cover:

- Overview of Analysis tools and simulation toolkits
 - Tools to evaluate and simulate Performance
 - Tools to evaluate and simulate Timing
- Variability
 - How to model the variability in MARTE (variability types, specific UML notations, etc.).

2.6.3.3b T6.2 Early V&V

Related to this task, training focused on the following areas is needed:

- Overview to the Test modelling, regarding the specification of the structural and behavioural aspects of the testing software.
 - UML 2.0 Testing Profile (U2TP)
- How to use models to generate test scenarios, tools (SUT) and techniques.
- Management of the traceability between test scenarios and requirements
 - Requisite tools
 - Techniques for traceability
 - Test Management Tools
- Management of the Variability in testing, tools and techniques.

2.6.3.3c T6.3 Specification of a Certification Metamodel for Energy Management Deployments

In this context, industrial partners need information about Types of Certification and the steps to achieve the Certification for a specific Metamodel, Software or Product. Within this activity, the most relevant activity useful for training could be:

Manage Certification for a *Metamodel*, guidelines for eDIANA Metamodel Certification.

- Certification Standards and Actors
- Different types of Certification (Product, Process, Personnel and Accreditation of certification)
- Steps to achieve eDIANA Certification.

- Dependencies within the overall process.
- Identify Problems and how to solve them.

2.7 Conclusions and Action Plan Proposal

The above sections intend to summarize *Task 11.2 – Education and Training Plan* of the eDIANA project. Its goals were briefly mentioned. Moreover, other projects were studied to see if their training plans could serve as examples for the eDIANA training plan, identifying the AMICO project as the most promising one. Then, an overview of the training activities carried out by the eDIANA partners that are available was made.

In the second part, the main stakeholders of eDIANA were described and a suggestion of their training needs was presented. With the aim of fulfilling such needs, the following steps were proposed that lead to the actual training plan.

1. **Prepare and send a questionnaire to the eDIANA partners:** The goal would be twofold: *(i)* address the first activity of the task (i.e. *Analysis of the current training situation with the partnership and training scope*), by assessing the current training situation of each partner and *(ii)* update the training activities performed by each partner, also inquiring about any available material that could be made publicly accessible.
2. **Analyze the questionnaire answers:** Once the responses of the questionnaire are gathered, an analysis of them would be performed. The outcome would also be twofold: *(i)* the analysis of the current training situation with the partnership and *(ii)* the list of performed activities.
3. **Match the training needs with the performed activities:** As a result of this activity, a list of training needs that have not been fulfilled were obtained.
4. Divide the different needs that have not been fulfilled among the eDIANA partners that participate in this task.
5. Develop the training material.
6. If feasible, upload the interesting material to the web.

3. Assessment: Education and Training Requirement Evaluation Questionnaire

This section presents the questionnaire for eDIANA partners in the scope of "*Task 11.2 Education and Training*", which is part of "*WP-11 Awareness, Dissemination and Training*". The goal is twofold: *(i)* address the first activity of the task (i.e. analysis of the current training situation with the partnership and training scope), by assessing the current training situation of each partner and *(ii)* update the training activities performed by each partner, also inquiring about any accessible material. The answers to this questionnaire were used for *(i)* determining and fulfilling the training

needs of eDIANA partners and (ii) defining a training plan, emphasizing the training needs that have not been satisfied at this point of the project.

3.1 Current Training Situation

A consequence of globalization of economy and companies operating at national and international level is the emergence of the need for a flexible and dynamic workforce with multiple skills to fit the required changes, and increase competitiveness and innovation. With the aim of aiding eDIANA partners achieve this goal; this first questionnaire block intends to evaluate the training situation among the partners and their surroundings. The objective is to establish your particular training needs.

1. How would you evaluate in your organization the average training in the areas comprised by the eDIANA project?

	Very Poor		Poor		Average	x	Good		Very Good
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2. In the event you consider that there is room for improvement, what are the areas that you believe a specific training should cover? (Please, fill in as many tables as you deem necessary).

Training Area	
WP Number	
Suggested Topics	
Stakeholders	
Format	

- *Training Area:* General area covered by the suggested training activity.
- *WP Number:* The WP it is related to.
- *Suggested Topics:* Specific topics inside the area that you believe should be covered.
- *Stakeholders:* The type of stakeholders the training should be directed to (e.g. professionals of some area, students, researchers...).
- *Format:* The training format you suggest (e.g. seminar, web tutorial...).

3. Consider now your knowledge area and the organizations working in similar or related areas, how would you evaluate their average training in the areas comprised by the eDIANA project?

	Very Poor		Poor		Average	x	Good		Very Good
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4. In the event you consider that there is room for improvement, what are the areas that you believe a specific training should cover? (Please, fill in as many tables as you deem necessary).

Training Area	
WP Number	
Suggested Topics	
Stakeholders	
Format	

- *Training Area:* General area covered by the suggested training activity.
- *WP Number:* The WP it is related to.
- *Suggested Topics:* Specific topics inside the area that you believe should be covered.
- *Stakeholders:* The type of stakeholders the training should be directed to (e.g. professionals of some area, students, researchers...).
- *Format:* The training format you suggest (e.g. seminar, web tutorial...).

3.2 Performed Training Activities

The objective of this second block is to gather together the different training activities that have already been performed by the eDIANA partners. They served as a baseline for the definition of the training plan.

1. Please, fill in one table for each of the training activities you have performed.

Training Area	
WP Number	
Date	
Place	
Covered Topics	
Participants	
Format	
Material?	
Feedback	

- *Training Area:* General area covered by the training activity.
- *WP Number:* The WP it is related to.
- *Date:* When the activity was performed.
- *Place:* Where it happened.
- *Covered Topics:* Specific topics inside the area that were covered.
- *Participants:* The type of participants (e.g. professionals of some area, students, researchers...).
- *Format:* The format of the training activity (e.g. seminar, web tutorial...).
- *Material?:* Whether or not you would be willing to make the training material available to others (e.g. by publishing it in the eDIANA website).

4. Questionnaire results

4.1 Training situation

		Training in your organization	Training in similar organizations
ELSAG DATAMAT	ED	3,5	3,5
INFORMATION & IMAGE MANAGEMENT SYSTEMS	I&IMS	4	4
INFINEON TECHNOLOGIES	INFINEON		
TECNALIA/LABEIN	LABEIN	4	4
FAGOR ELECTRODOMESTICOS	FAGOR	3	3
PHILIPS ELECTRONICS NETHERLANDS	APPTECH	4	4
PHILIPS CONSUMER LIFESTYLE	PCL	4	4
PHILIPS RESEARCH	PRES	3	4
ST MICROELECTRONICS	ST	4	4
UNIVERSITY OF BOLOGNA	UNIBO	5	5
UNIVERSITY OF ROME LA SAPIENZA	UOR	2	
MONDRAGON GOI ESKOLA POLITEKNIKO	MU	4	4
AVG		3,681818182	3,95

Evaluation	
Very Poor	1
Poor	2
Average	3
Good	4
Very Good	5

4.2 Suggested training

Partner	Training Area	WP Number	Suggested Topics	Stakeholders	Format
Labein	Wireless communications in building domains	WP02	Due to its importance, any.	Building automation manufacturers, Architects	On site workshops and seminars. Webcast
Labein	Modeling and Validation techniques	WP06	Due to its importance, any.	Building automation manufacturers, Architects	On site workshops and seminars. Webcast
Labein	Building Modeling	WP04	Building modeling related to its energy performance	Building designers, BMS designers	On site workshops and seminars. Webcast
Fagor	Energy management applications	WP01	Specification of customer and end user requirements, Monitoring energy consumption	Home automation manufactures and installers, house architectural consultancy	Seminar, web tutorial
Fagor	Wireless communications at home	WP02	Wireless communications suitable for the home environment	Home automation manufactures and installers, house architectural consultancy	Seminar, web tutorial
Fagor	Verification & Validation techniques	WP06	Verification & validation of new products	Home automation manufactures and installers, house architectural consultancy	Seminar, web tutorial

PRES	Energy markets	WP04	Demand Response programs and markets	Researchers	Web tutorial
PRES	Smart Grid standardization	WP09	Overview and customer domain focus	Researchers	Web tutorial
UOR	Application and advantages of the eDIANA system. (In our university the administration often sends email to employees in order to remind to switch off lights and air conditioners in the evening. This is common in many public work places. An eDIANA system would help to save and optimize energy without employees' help.) The eDIANA project should be advertised in any public administration.	All but specifically WP1 and WP10	Energy saving through eDIANA system	Public administrations	Flyer, web presentation
I&IMS	ZigBee	WP02	Architecture, Profiles, Applications	Communication engineers	Technical seminar
I&IMS	PLC communication	WP03	Architecture, Profiles, Applications	Communication engineers	Technical seminar
I&IMS	IP cameras: commercial applications	WP2 and WP3	Communication protocols; Supervision applications; Video analysis algorithms	Technical or management responsible	Technical seminar
ST	Software Integration	WP05		Professionals	Seminar
ED	Refresher Course	WP02	New technologies to be adopted for the communication between the different devices	Professionals of the technical area	Seminar
ED	Refresher Course	WP03	New technologies to be adopted (e.g. new devices capable of having an internet connection, new 'intelligent' appliances)	Professionals of the technical area	Seminar
ED	Refresher Course	WP02	Technologies for the energy efficiency.	Professionals of the technical area	Seminar

4.3 Performed training

Partner	Training Area	WP Number	Date	Place	Covered Topics	Participants	Format	Material	Feedback
Labein	MCC Development Guidelines	WP04	31 st of March of 2010	eDIANA web	MCC design guidelines	Partners involved in task 4.1. ACCIONA, ED, Labein, PRES, UNIBO	Deliverable	Deliverable	Comments and corrections among involved partners
Fagor	iEI Integration Workshop	WP05	18 th of January 2011	IKERLAN	iEI integration on cell level devices	IKERLAN, ACCIONA, TECNALIA, FAGOR	Seminar	Deliverable	Comments and results among involved partners
UNIBO	Wireless Sensor Networks	WP01 and WP02	January 12, 2011	University of Bologna	eDIANA scenarios, applications and the communication	Students	Course for Master students	Yes. You can find the slides of the lecture dedicated to eDIANA on the website of Chiara	

					n part of the eDIANA platform			Buratti	
UOR	Wireless sensor networks (WSN)	WP02	2010	University of Rome - Italy	MAC/routing protocols for WSN, multi-channel protocols	About 30-40 students	Seminar lessons		
ST	Software Integration	WP05	October 15th, 2010	ST Castelletto, Cornaredo (MI)	Development on SPEAR	4 Partners, Students, Professionals and Researchers	Seminar	Slides	

5. Future training

The following seminar and courses will be taught in the near future:

- UOR will do two seminars: "The eDIANA project: solutions for energy-efficient buildings" and "The eDIANA project: energy-efficient wireless sensor networks" in the Wireless Networks course at Computer Science Department, Sapienza University of Rome - Italy.
 - Attendance to the seminar will include Master Degree and PhD students.
 - They are currently working on the training material that will be available soon at:
<http://twiki.di.uniroma1.it/pub/Wireless/WebHome/ediana.pdf> and
<http://twiki.di.uniroma1.it/pub/Wireless/WebHome/ediana-wsn.pdf>
- MU will lecture a Verification and Validation course in the embedded system master of MU.
 - This course includes topics about V&V for embedded systems.

6. Training plan

The suggested training not yet performed or planned was prioritised and which training material prepare was decided:

- "Wireless communications in building domains", "Wireless communications at home" and "ZigBee" have been combined in a training that UNIBO has prepared.
- "Modeling and Validation techniques" and "Verification & Validation techniques" have been combined in a training that MU has prepared.
- "PLC Communication" training has been prepared by Ikerlan.

- “Software Integration” was covered in a workshop organized by Fagor and Ikerlan (and in another one organized by ST).
- Training material about “Energy markets” and “Smart Grid standardization” is already available in other deliverables.

7. Training material

7.1 Training material of performed training

The following training material from performed training is available (apart from the material in deliverables):

7.1.1 Wireless Sensor Networks

Available in

http://www.chiaraburatti.org/uploads/teaching/handouts_WSNs_11_10.pdf



The image shows a handout for a course titled "Wireless Sensor Networks". At the top left is the logo for "RN radio networks". At the top center is the title "Wireless Sensor Networks". At the top right is the name "Chiara Buratti" and "DEIS, University of Bologna" next to a small circular logo. The main title "Wireless Sensor Networks" is in large blue font. Below it, the name "Chiara Buratti" is in blue. Then, the email "c.buratti@unibo.it" and phone number "+39 051 20 93549" are listed. Below that, the "Office Hours" are given as "Tuesday 3 – 5 pm @ 'CSITE' Building within main campus, first floor". At the bottom, it says "Credits: 6".

7.2 Prepared training material

The following training material has been prepared and it is available attached to this deliverable:

7.2.1 Wireless communications: ZigBee



7.2.2 Verification & Validation



7.2.3 PLC Communication



8. Conclusions

This deliverable is the result of the actions performed in task 11.2: First of all, an action plan with clear training requirements was defined. After that, a questionnaire was defined to assess the current training situation of each partner and update the training activities performed by each partner.

The answers to the questionnaire were used for determining the training needs of eDIANA partners and identifying already satisfied training needs: performed training. And for defining a training plan, emphasizing the training needs not yet satisfied. And finally training material for the training needs not yet satisfied was prepared.

The training material is available in deliverables and in the material attached to this deliverable.

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