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## **CIPRNet**

**Critical Infrastructure Preparedness and Resilience Research Network**

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PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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Remarks	---

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# TABLE OF CONTENTS

- TABLE OF CONTENTS..... 3**
- 1 INTRODUCTION..... 4**
  - 1.1 Acronyms ..... 5
- 2 COURSE INSIDE THE POST GRADUATE MASTER IN HOMELAND SECURITY..... 6**
  - 2.1 Venue ..... 6
  - 2.2 Program ..... 7
  - 2.3 Attendees..... 7
  - 2.4 Feedback..... 9
  - 2.5 Comments..... 11
  - 2.6 How data collected from Participant Satisfaction Forms have improved the course..... 11
- APPENDIX A – PROGRAMME..... 12**
- APPENDIX B – TRAINING MATERIAL ..... 14**
- APPENDIX C – LIST OF ATTENDEES ..... 15**
- APPENDIX D – CERTIFICATE OF ATTENDANCE ..... 18**
- APPENDIX E – PARTICIPANT SATISFACTION FEEDBACK ..... 19**

# 1 Introduction

Internal and external training activities represent a mandatory cornerstone to create of a European community able to support the realization of the EISAC (European Infrastructures Simulation & Analysis Centre) and to exploit its functionalities. CIPRNet will arrange specific training activities aiming to provide basic and advanced knowledge about Critical Infrastructure MS&A (Modelling, Simulation and Analysis) targeted to a broad range of personnel related to CI (including, but not limited to, local administrations, utilities personnel, emergency operators and managers, security & safety operators and managers, CIP researchers, CIP policy makers, etc.).

The courses inside the Post Graduate Master in Homeland Security consist of three training editions scheduled for 2014, 2015, and 2016 in Rome.

The courses consist of a generic part for each episode, dealing with basic knowledge in MS&A (repeated at each episode), followed by a more advanced part specified as following:

- ✓ Episode 2014: Federated Simulation and Open MI platform
- ✓ Episode 2015: Decision Support System (DSS)
- ✓ Episode 2016: What-if Analysis

During the course, the attendees also have the chance to practice with the tools developed within the CIPRNet project (i.e. federated simulation, decision support systems and ‘what if’ analysis, within the three editions). This approach will certainly foster the new generation of risk assessment/management tools, which will enable an easier and more effective management of crises.

This deliverable describes in details the third course inside the Post Graduate Master in Homeland Security in terms of training materials, scheduling and attendees’ feedback monitoring.

The structure of this document is composed of two sections: the first one introduces the course in terms of venue, programme and attendees. The second one, made up of appendices, collects the material prepared for the course and/or collected during the course.

## 1.1 Acronyms

Acronym	Explanation
CA	Consequence Analysis
CI	Critical Infrastructure
CIP	Critical Infrastructure Protection
CIPRNet	Critical Infrastructure Preparedness and Resilience Research Network
DSS	Decision Support System
EISAC	European Infrastructures Simulation & Analysis Centre
EU	European Union
FP	Framework Programme
GIS	Geographic Information System
GUI	Graphical User Interface
MS&A	Modelling, Simulation and Analysis
OpenMI	Open Modelling Interface
PA	Public Authority
PSF	Participant Satisfaction Form
S&A	Simulation and Analysis
VCCC	Virtual Centre of Competence and expertise in CIP

## 2 Course inside the Post Graduate Master in Homeland Security

The course on Modelling, Simulation and Analysis of Critical Infrastructures has confirmed the importance of pursuing training activities within the project. The present deliverable aims to illustrate the third edition of the course held inside the Post Graduate Master in Homeland Security with a considerable focus on the audience's feedback.

The third edition of this two-day event offered the opportunity to the attendees to familiarise with the modelling, simulation and analysis tools developed within the CIPRNet project. The program of the course is based on the design of the general training course, consolidated during the first and the second edition of the Course and of the Master Class, and taking into account the results of the participant satisfaction forms collected during these mentioned previous events. The program of the second day is mainly focused on the CIPRTrainer tool developed within the CIPRNet project. The new lessons have been tested and updated in accordance with the results of an internal rehearsal performed on 6<sup>th</sup> and 11<sup>th</sup> July 2016 at Fraunhofer premises.

The Course provides a challenging learning environment where research endeavours are applied to real-world challenges associated with man-made and natural emergencies and critical incidents on the local, national, and global levels. Teachers bring their various professional, disciplinary, and cultural backgrounds into the learning processes.

Similar to the previous training events, the scheduling of this one has been slightly modified in order to meet speakers' needs and attendees' feedback to adopt a similar logical sequence of the lectures. All the lectures have been video-recorded in order to set up a MOOC (Massive Open Online Course) platform with the aim to deliver this material to a broader audience.

### 2.1 Venue

The Course has been held in the Trapezio building Aula Magna of the University Campus Bio-Medico of Rome (Italy) on 14<sup>th</sup> – 15<sup>th</sup> July 2015. The event has been organized by UCBM and Fraunhofer within the lessons of the Post Graduate Master in Homeland Security.



Figure 1: Venue of the course, UCBM

## 2.2 Programme

Nowadays security is one of the fastest growing challenge, with applicability in a wide set of different industries and fields, such as services, infrastructures, government and business. The competences provided in the Post Graduate Master give the student the chance to branch out into other areas, and develop unique skill sets.

Because the course of Modelling, Simulation and Analysis of Critical Infrastructures covers a broad area of topics, the Post Graduate Master in Homeland Security focuses on the dynamics of technological innovation and the need of adaptive behaviour of businesses and markets. Within these dynamics it is possible to narrow the focus even further and learn the essential skills to work in one of several emerging or well-established industries.

The program of the course is based on the design of the general training course, as described in D9.1 CIPRNet training Plan (chapter 2.2) and taking into account the results of the participant satisfaction forms collected during the previous internal CIPRNet Course (Delft, 3-4 February, 2014), the Edition 1 and 2 of the Master Class (Paris, 24-25 April, 2014 and Rome, 11-13 November, 2015) and the Edition 1 and 2 of the Course inside the Master in Homeland Security (Rome, 10-11 July, 2014 and 9-10 July, 2015).

During the second day of the course the CIPRTrainer, a new tool developed within the CIPRNet project, has been presented, described, and a demonstration with hands on exercises has been held in the afternoon in the computer room at UCBM. Specifically, the students have been allowed to use the CIPRTrainer tool to simulate the effect of different decisions while managing a crisis scenario, in order to improve their capability to manage complex situations and understand the potentialities and usefulness of the tools developed by CIPRNet project. Moreover, this session represent a relevant validation test for the CIPRTrainer.

A rehearsal has been held the 6<sup>th</sup> and 11<sup>th</sup> of July 2016 at Fraunhofer with the participation of Fraunhofer lecturers and UCBM auditors remotely connected, in order to better arrange the lectures foreseen for the third edition; specifically, the 6 lectures and the hands-on exercises of day 2 on the CIPRTrainer. The outcome of the rehearsal days is in the training material (Annex B).

A networking dinner with all attendees and lecturers of the CIPRNet Course has been held the 14<sup>th</sup> July, in order to foster the dialogue between different field experts and future professionals.

## 2.3 Attendees

The course inside the Homeland Security Post Graduate Master was attended by 22 students of the master, 19 participants from CIPRNet consortium (including lecturers), 3 members of the CIPRNet International Advisory Board and 3 external participants, for a total of 47 attendees including the lecturers. The external participants are former students of the Master and professionals coming from the partner companies of the Master. This kind of audience, composed of students of the Master in Homeland Security is particularly appropriate for the aim of the course, as it is designed for young security managers, public authorities' representatives, young security or CIP researchers, and law enforcement officers.

Similar to the Master Class, the aim of this course is to prepare next generation security managers and experts to the use of instruments as those provided by CIPRNet and by the VCCC. Moreover, this event contributes to acquire feedback on the training materials and on the VCCC services for heterogeneous end-users: public authorities who can take advantage of the skills acquired on the job as well as representatives of private companies who can use the arguments within the company.

The need for qualified professionals is expanding at national and local levels, and international too, so a homeland security education portfolio suits the needs of many individuals working in this field and fosters national as well as international careers. In the case of this third edition, that



includes the new topic of the CIPRTrainer, the feedback received by the attendees will be used to improve the third edition of the Master Class open to an external audience, which will be held in Bonn the 23<sup>rd</sup> – 24<sup>th</sup> November 2016 at Fraunhofer premises.

The list of all the attendees is reported in Appendix C. All the attendees received a “Certificate of Attendance” whose template is reported in Appendix D.



Figures 2, 3: Pictures from the hands-on exercises session.



## 2.4 Video-recording of lectures

In order to fulfil the second project review recommendations, each lecture given during the third edition of the CIPRNet course has been video-recorded and will be published on a dedicated platform for e-learning.

## 2.5 Feedback

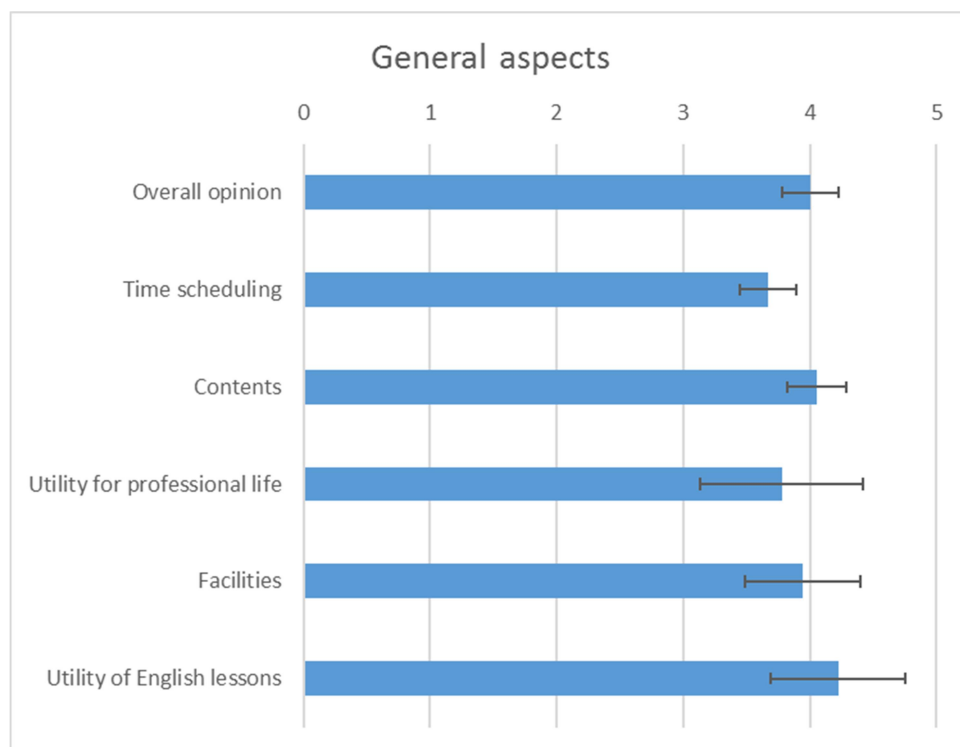
The effectiveness and the quality of the training have been evaluated on the basis of the feedback received from the attendees. To this end, a specific Participant Satisfaction Form (PSF) has been elaborated and submitted to all the attendees (Appendix E.2).

On the basis of 9 collected PSFs<sup>1</sup> the result was that the attendees have been satisfied by the course, enthusiastic regarding the CIPRTrainer “hands on” experience, and the overall satisfaction level is quite high. The feedback of this course confirmed the results of the first two editions of the training events, regarding the valuable opportunity to interact with experts and to acquire expertise regarding CIPRNet software tools.

Comments from PSFs regarding general aspects and the CIPRTrainer are reported in Annex E.1. Comments on specific lectures, if any, are sent to the lecturer for future improvement. The PSFs highlighted that the course has covered the expectation of the audience for almost all participants in terms of time scheduling, logistic facilities, contents and utility for their professional life.

Last, most of the attendees ask for a longer and more structured course, in particular in its CIPR-Trainer “hands on” session.

Figure 5 reports the results of the PSFs for the general aspects of the course, evaluated in a scale from 0 to 5.

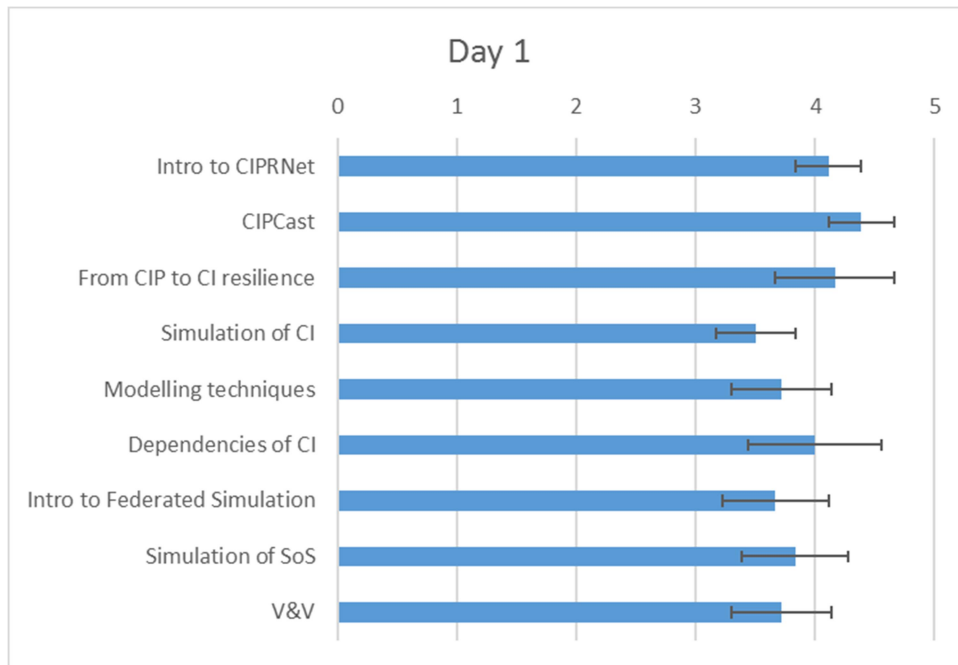


**Figure 5: Data collected from Participant Satisfaction Forms on general aspects.**

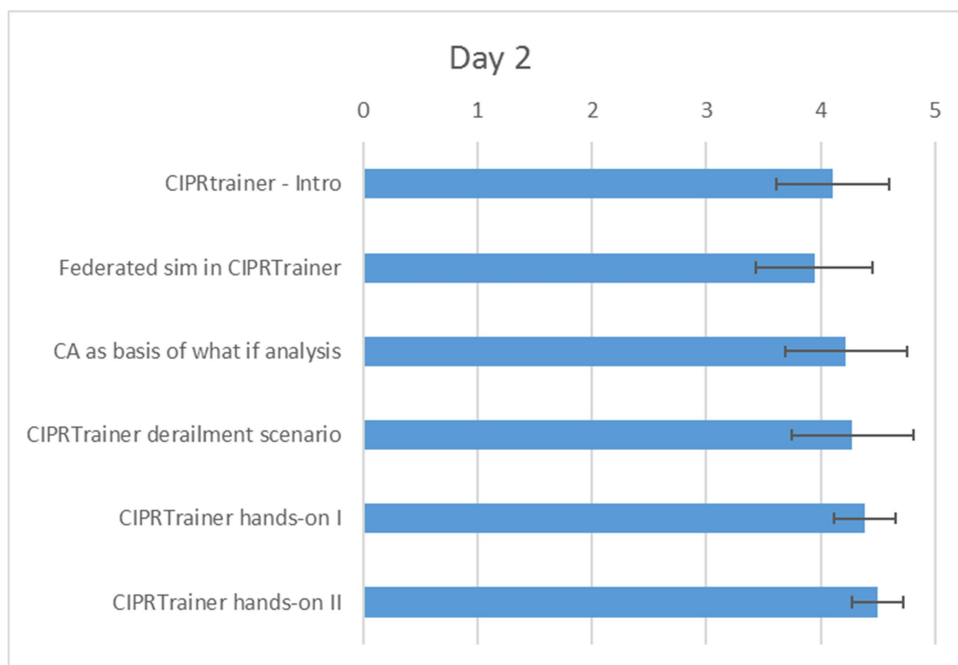
<sup>1</sup> The reduced number of PSFs collected is mainly due to very short time between the end of the course and the deadline for the delivery of this report (10 working days), close to the summer vacation period. It is foreseen to receive further PSFs after the vacation period; the related inputs will be managed to improve the third edition of the Master Class in November.

The Figures 6 and 7 show the average values of the scores obtained by each lecture of the course in day 1 and day 2 respectively.

Note that evaluations are positive for all speakers and average scores range from a minimum value of 3.50 to a maximum value of 4.50.



**Figure 6: Data collected from Participant Satisfaction Forms on day 1 lessons.**



**Figure 7: Data collected from Participant Satisfaction Forms on day 2 lessons.**

This valuable information will be used, similarly to the past training events, to improve the training material, scheduling, organization, and focus for the third edition of the CIPRNet Master Class that will be held in Sankt Augustin, at Fraunhofer premises, the 23<sup>rd</sup> and 24<sup>th</sup> November, 2016.

## **2.6 Comments**

In conclusion, the third edition of the Course on Modelling, Simulation and Analysis of Critical Infrastructures inside the Post Graduate Master in Homeland Security has been successfully carried out, explaining and clarifying the project's approach challenging the critical infrastructures protection context.

In the course, as occurred during the past training events, there was a great interaction between attendees and teachers, exchanging valuable and constructive ideas. Based on what detailed in this deliverable, the objectives set by the course have been achieved.

## **2.7 How data collected from Participant Satisfaction Forms have improved the course**

The first and second editions of the Master Class and of the Course inside the Homeland Security Master with all feedbacks received by PSFs have represented an extensive source of suggestions for improving the quality level of the course. Taking into account attendees' feedback is extremely important in order to improve the level of training activities for the next events.

While the general part of the Course (day 1) was almost consolidate as highlighted by the PSFs of the first and second editions of the course, the part related to the CIPRTrainer has been structured considering the general comments coming from the previous training events.

Some other changes in the programme have been applied due to teachers' availability matching time scheduling.

The high quality reached by the previous training events has been confirmed by the feedback received within this course, satisfactorily meeting the expectations of the attendees.

## Appendix A – Programme

Day 1 – 14<sup>th</sup> July 2016, Aula Magna, Trapezio building, Università Campus Bio-Medico di Roma

Teacher	TOPIC	TIME
<b><i>Taking seats</i></b>		<b><i>9.30 – 10.00</i></b>
<b>Roberto Setola (UCBM)</b>	Welcome	10.00 – 10.10
<b>Roberto Setola (UCBM)</b>	Introduction to CIPRNet	10.10 – 10.50
<b>Vittorio Rosato (ENEA)</b>	CIPcast – a decision support system for CI related crisis management	10.50 – 11.30
<b>Marianthi Theodoridou (JRC)</b>	From Critical Infrastructure (CI) Protection to CI Resilience	11:30 – 12.10
<b><i>Coffee break</i></b>		<b><i>12.10 – 12.30</i></b>
<b>Eric Luijff (TNO)</b>	Simulation of CI: relevant applications	12.30 – 13.10
<b>Mohamed Eid (CEA)</b>	Principal modelling techniques: applications and limitations	13.10 – 14.00
<b><i>Lunch</i></b>		<b><i>14.00 – 15.00</i></b>
<b>Roberto Setola (UCBM)</b>	Modelling and investigating dependencies of CI	15.00 – 15.40
<b>Edwin van Veldhoven (TNO)</b>	Introduction to Federated Simulation	15.40 – 16.20
<b><i>Coffee break</i></b>		<b><i>16.20 – 16.40</i></b>
<b>Alberto Tofani (ENEA)</b>	Simulation approaches of System of Systems	16:40 – 17:20
<b>Edwin van Veldhoven (TNO)</b>	Verification and validation techniques	17.20 – 18.00
<b>All</b>	<b><i>Networking dinner at Checco dello Scapicollo (via dei Genieri 11, Roma)</i></b>	<b>20.00</b>

Day 2 – 15<sup>th</sup> July 2016, Aula Magna, Trapezio building, Università Campus Bio-Medico di Roma

Teacher	TOPIC	TIME
<b>Erich Rome &amp; Jingquan Xie (Fraunhofer)</b>	CIPRTrainer – training the exploration of different courses of action <ul style="list-style-type: none"> <li>• »what if« analysis as a new capability for crisis management training</li> <li>• CIPRTrainer system overview</li> <li>• Modeling in CIPRTrainer</li> <li>• Event processing in CIPRTrainer</li> <li>• fMS&amp;A and rollback for »what if« analysis</li> <li>• Training concept</li> <li>• Q&amp;A</li> </ul>	9:15 – 10:15
<b>Coffee Break</b>		10:15 – 10:30
<b>Stefan Rilling (Fraunhofer) &amp; Elias Kyriakides (UCY)</b>	Federated simulation in CIPRTrainer <ul style="list-style-type: none"> <li>• Infrastructure Simulators</li> <li>• Infrastructure Models</li> <li>• Federated Simulation</li> <li>• Modelling dependencies</li> <li>• Preserving causality</li> <li>• Conclusion</li> <li>• Q&amp;A</li> </ul>	10:30 – 11:15
<b>Norman Voß (Fraunhofer)</b>	Consequence analysis as a basis for »what if« analysis <ul style="list-style-type: none"> <li>• Application areas</li> <li>• CIPRNet’s hybrid CA approach</li> <li>• Methods for assessing impact and consequences of crises and disasters</li> <li>• Data elicitation</li> <li>• Data handling</li> <li>• CA assessment and presentation in CIPRTrainer</li> <li>• Conclusion</li> <li>• Q&amp;A</li> </ul>	11:15 – 12:00
<b>Lunch break</b>		12:00 – 13:00
<b>Stefan Rilling (Fraunhofer)</b>	CIPRTrainer derailment scenario with cross-border aspects <ul style="list-style-type: none"> <li>• Scenario storyline</li> <li>• Rules</li> <li>• Scenario database</li> <li>• Q&amp;A</li> </ul>	13:00 – 13:40
<b>Betim Sojeva (Fraunhofer)</b>	CIPRTrainer demonstration and hands-on experience Part I <ul style="list-style-type: none"> <li>• CIPRTrainer GUI, GIS functionality, User roles: Trainer, trainees</li> <li>• »what if« analysis for exploring different courses of action</li> </ul>	13:40 – 14:15
<b>Coffee break, moving to the Computer Classroom</b>		14:15 – 14:30
<b>Participants</b>	Hands-on Part 1: Familiarising with the CIPRTrainer GUI	14:30 – 15:15
<b>Erich Rome &amp; Betim Sojeva (Fraunhofer)</b>	CIPRTrainer demonstration and hands-on experience Part II <ul style="list-style-type: none"> <li>• Crisis management actions in CIPRTrainer</li> </ul>	15:15 – 15:45
<b>Participants</b>	Hands-on Part 2: Using CIPRTrainer for exploring different courses of action	15:45 – 17:15
<b>All</b>	Wrap-up	17:15 – 17:30

# Appendix B – Training Material



## Appendix C – List of Attendees

FIRST NAME	LAST NAME	AFFILIATION	NOTES
Albanese	Alfredo	R.F.I	HS Master student
Angelino	Francesca	POSTE ITALIANE	HS Master student
Bellantone	Paolo		HS Master student
NN	NN	POLIZIA DI STATO	HS Master student
Bocci	Gianluca		HS Master student
Bogogna	Giovanni		HS Master student
Campagnano	Filomena		HS Master student
D'Agostino	Cristian		HS Master student
Fanelli	Livio	POSTE ITALIANE	HS Master student
NN	NN	ARMA CARABINIERI	HS Master student
Gallante	Michele		HS Master student
Maraschi	Carlotta	FERROVIE DELLO STATO	HS Master student
Mazzilli	Alessandro		HS Master student
Mercatante	Daniele		HS Master student
Ruggeri	Claudia		HS Master student
Scalisi	Michele	POSTE ITALIANE	HS Master student
Strona	Paola		HS Master student
Tesei	Marco	UCBM	HS Master student

FIRST NAME	LAST NAME	AFFILIATION	NOTES
Testa	Anthony	NCIA/NATO	HS Master student
Valenza	Domenico		HS Master student
NN	NN	ARMA CARABINIERI	HS Master student
Zaccaria	Alessandra		HS Master student
Eid	Mohamed	CEA	CIPRNet Course Lecturer
Luijff	Eric	TNO	CIPRNet Course Lecturer
Rilling	Stefan	Fraunhofer	CIPRNet Course Lecturer
Rome	Erich	Fraunhofer	CIPRNet Course Lecturer
Rosato	Vittorio	ENEA	CIPRNet Course Lecturer
Setola	Roberto	UCBM	CIPRNet Course Lecturer
Sojeva	Betim	Fraunhofer	CIPRNet Course Lecturer
Theocharidou	Marianthi	JRC	CIPRNet Course Lecturer
Tofani	Alberto	ENEA	CIPRNet Course Lecturer
Van Veldhoven	Edwin	TNO	CIPRNet Course Lecturer
Voß	Norman	Fraunhofer	CIPRNet Course Lecturer
Agresti	Elena	POSTE ITALIANE	External, HS Master board
De Cillis	Francesca	UCBM	CIPRNet partner
De Maggio	Maria Carla	UCBM	CIPRNet partner
Di Luzio	Marco	UCBM	CIPRNet partner

FIRST NAME	LAST NAME	AFFILIATION	NOTES
Di Marcello	Clio	UCBM	CIPRNet partner
Hammerli	Bernhard	ACRIS	CIPRNet partner
Heracleous	Constantinos	UCY	CIPRNet partner
Larrañeta	Javier Jose	TECNALIA/PESI (ES)	CIPRNet IAB member
Lauwe	Peter	BBK (DE)	CIPRNet IAB member
Maranesi	Marcello	E-GEOS (IT)	CIPRNet IAB member
Montoni	Leda	UCBM	CIPRNet partner
Oliva	Gabriele	UCBM	CIPRNet partner
Polito	Lucia	NITEL	External, HS Master board
Stazi	Maria Letizia	TELECOM ITALIA	External, HS Master board

## Appendix D – Certificate of Attendance

 **CIPRNet**  
Critical Infrastructure Preparedness and Resilience Research Network



**CERTIFICATE OF ATTENDANCE**

-Name and First name-  
\_\_\_\_\_

Hereby recognised for participation in

**CIPRNet Course on Modelling, Simulation and Analysis of Critical Infrastructures (Edition 3)**

Organised by University Campus Bio-Medico of Rome and Fraunhofer

July 14<sup>th</sup> - 15<sup>th</sup>, 2016  
Rome (Italy)

Dr. Erich Rome (Fraunhofer)  
Prof. Roberto Setola (UCBM)

## Appendix E – Participant satisfaction survey

### E.1 – Participant satisfaction feedback

Below comments from the PSF are reported.

#### General Aspects

What were the most positive aspects of this course?

- The most positive aspect was the attempt by the speakers to demonstrate the practical utility of every theoretical approach on CIPRNet
- The CIPRTrainer demonstration and “hands on” session (several attendees gave this comment)
- The innovative approach

Which aspects should be improved in terms of topics, clarity, and time scheduling?

- Sometimes the argument was not so clear to the people without a technical background (e.g. the federated simulation and the event processing in CIPRTrainer)
- More general presentation of tools should be given
- Lessons should be distributed in more days
- More case studies should be illustrated

Notes (please provide general comments and suggestions)

- The CIPRNet course was useful but it would have been even more useful if the “hands-on” part had lasted the whole day. Very interesting tips on IMPROVER project and CIPedia for the tools box of a researcher!
- More time to enable everyone to participate to the “hands on” session should be spent

#### General questions on CIPRTrainer

What improvements for the existing user interface would you propose?

- The existing user interface can be improved with an archives of best practices, containing the successful practices in crisis management, in order to provide the public decision maker with a further support instrument.
- Develop other scenarios

From what additional features could CIPRTrainer benefit in what way?

- CIPRTrainer could represent a useful tool to increase the social awareness and preparedness in case of emergencies too, with the aim to promote a constructive collaboration in crisis scenarios between citizens and public authorities.

How could the introduction to the “hands on” part be improved?

- The “hands on” part can be improved as a role-playing game, involving people to play the attacker role, who cause an accident, and the public decision making role, who have to resolve the consecutive crisis.



## E.2 – Participant satisfaction form