



# **“Final Report On DICONET Exploitation And Dissemination Plans Including Contribution To Standards”**

*D7.4*

**'DICONET\_D7 4\_WP7\_270710\_ECI\_V1.0'**

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**The DICONET Project Consortium groups the following Organizations:**

Partner Name	Short name	Country
JCP-Consult	JCP	FR
Research and Education Laboratory in Information Technologies	AIT	GR
Center of REsearch And Telecommunication Experimentations for NETworked communities	Create-NET	IT
Institut Telecom, Télécom ParisTech	TPT	FR
Huawei Technologies Düsseldorf GmbH	HWDU	DE
Interdisciplinair Instituut voor Breedband Technologie, VZW	IBBT	BE
Research Academic Computer Technology Institute	CTI	GR
University of Essex	UEssex	UK
Universitat Politècnica de Catalunya	UPC	SP
ADVA AG Optical Networking	ADVA	DE
Deutsche Telekom AG	DTAG	DE
Alcatel-Lucent Bell Labs France	A-LBLF	FR
ECI Telecom	ECI	IL

**Abstract:** This objective of this document is to give a complete overview of dissemination activities undertaken (exhaustive list of all the papers, contributions to standardization and public demonstrations published or performed within the Diconet project duration) from January 1<sup>st</sup>, 2008 to July 31<sup>st</sup>, 2010)

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	Comments:			
20			David Dahan- ECI	28/07/2010
	Comments:	Final revisions		

## Executive Summary

This document aims at providing a cumulative overview of the undertaken project's dissemination activities; this report is the final document further to the first version provided in D7.2 in M18 [1].

The *D7.4* is dedicated to the description of the dissemination measures, including all scientific publications relating to foreground. Its content is made available in the **public domain** thus demonstrating the added-value and positive impact of the project on the European Community.

This last deliverable also provides information on the future route to full use (exploitation or use in further research) and dissemination of the knowledge.

This deliverable is divided within 2 main parts:

*Part I* is dedicated to the description of the dissemination measures, including any scientific publications relating to foreground. Its content will be made available in the **public domain** thus demonstrating the added-value and positive impact of the project on the European Community.

*Part II* is specifying the exploitable foreground and provides the plans for exploitation the outputs of the DICONET project by all the partners.

It will be **kept confidential** and will be treated as such by the commission.

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## 1 Standards definitions

All definitions are listed either in the Annex II – General Conditions to the Grant Agreement – or in the Consortium Agreement. [2][3][4] [5].

Some essentials definitions are reminded or complemented below.

**“Confidential Information”** means any and all information that is disclosed or otherwise made available by the disclosing Party to the receiving Party pursuant to the Consortium.

Agreement including, without but not limited to: Background, Sideground and/or Foreground; financial information, such as but not limited to pricing and customer lists; technical information, such as but not limited to research, development, algorithms, procedures, software and know-how; business information, such as but not limited to operations, planning, marketing interests and products.

Such information may be disclosed or made available orally, in written (including but not limited to, fax, e-mail, text message (SMS)) or machine readable format or other tangible including but not limited to raw materials, components, models, prototypes or any tool or equipment whatsoever) or intangible form (including but not limited by visual inspection during any tour of the disclosing Party’s facilities or premises).

**“Dissemination”** means the disclosure of foreground by any appropriate means other than that resulting from the formalities for protecting it, and including the publication of foreground in any medium;

**“Use”** means the direct or indirect utilization of Foreground in further research activities other than those covered by the project, or for developing, creating and marketing a product or process, or for creating and providing a service. Direct utilization is done by the participant owning the Foreground (e.g. though further research or commercial or industrial exploitation in its own activities) while indirect utilization is done by other parties (e.g. through licensing).

## **2 PART 1 - Description of the dissemination measures**

### **2.1 List of dissemination activities**

Dissemination of project visions and results has huge importance in the DICONET project. The mentioned impact can be realized only if there is a large consensus among the scientific and industrial communities about the concepts, architecture and system investigated by the DICONET project.

In order to make the DICONET vision become a reality in the future, information about the proposed changes has been brought on to the research community and the decision-making actors in the market via several channels.

As a general tool for dissemination and in order to help in the communication, the DICONET factsheet has been produced and, at the same time, a poster presenting DICONET "at a Glance" was designed and printed and was also distributed during relevant events.

The dissemination activities that were performed by the project are:

#### **2.1.1 International and National Conferences and Workshops**

The dissemination activities that were performed or are planned by the project are in International and National Conferences and Workshops as shown in the table below and as well as in standard activities. Project results were and will be published through articles and papers at various international and national conferences and workshops. There are a huge number of such conferences, thus the partners keep a critical eye on the quality of these in order to make a qualified selection of appropriate conferences to participate at. The papers accepted and /or presented during those events are listed in the table on page 10.

The events that have been attended from the project start in January 2008 till end of July 2010 are:

- OFC 2008 (March 2008 San Diego, USA)
- ICTON 2008 (June 2008 in Athens, Greece )
- CNSDSP 2008 (July 2008 in Graz, Austria)
- During ECOC 2008, (September 2008 in Brussels, Belgium) a workshop called "All-Optical versus OEO Networks" has been organized under the auspices of EU Network of Excellence BONE and the support of EU projects TRIUMPH & DICONET
- IEEE GLOBECOM 2008 (December 2008 in New-Orleans, USA)
- During ONDM 2009, (February 2009 in Braunschweig, Germany) DICONET sponsored a technical session (Session 6: Provision and physical layer impairments) that has been chaired by Matthias Gunkel, Deutsche Telekom, Germany  
[[http://www.ida.ing.tu-bs.de/noncms/ondm2009/schedule/final\\_program.php](http://www.ida.ing.tu-bs.de/noncms/ondm2009/schedule/final_program.php)].
- OFC 2009 (March 2009 – in San Diego, USA)
- IEEE INFOCOM 2009 (April 2009 in Rio de Janeiro, Brazil)
- IEEE ICC 2009 (June 2009 in Dresden, Germany)

- ICTON 2009 (June 2009 - Island of São Miguel, Azores, Portugal)
- ECOC 2009 (September 2009 in Vienna, Austria) a symposium called “*Dynamic Multi-Layer Mesh Network ... Why, How, and When?*”
  - ✓ **Organizers:**
    - Sander Jansen, Nokia Siemens Networks
    - Yvan Pointurier, Athens Information Technology (AIT)
    - Brandon Collings, JDSU
  - ✓ **Abstract**

*The ever-increasing demand for increased capacity and level of service at a lower cost are key drivers fueling the evolution of core optical networks from statically provisioned optical links interconnected with electronic switching and regeneration to more complex and flexible, optically switched mesh topologies with dynamic provisioning. The major advantages of these flexible networks include prompt and efficient system deployment and commissioning, removal of expensive and inflexible optical-electrical-optical equipment, and rapid wavelength and service provisioning. This evolution from point-to-point links to reconfigurable optical networks is enabled by many technologies, such as physical layer photonic cross connects to the control and management techniques such as GMPLS and multi-layer network design. This symposium will give an overview of the implementations, challenges and benefits of current and next generation dynamic multilayer optical mesh networks. Major network operators will detail their motivation to transition to dynamic multi-layer mesh networks and comment on the timeframe for such transitions. Component suppliers and network designers will describe current and future implementations and capabilities of these networks.*
- BROADNETS 2009 (September 2009 in Madrid, Spain)
- GRIDNETS 2009 (September 2009 in Athens, Greece)
- IEEE GLOBECOM 2009 (December 2009 in Hawaii, USA)
- IEEE ANTS 2009 (December 2009 In New-Delhi, India)
- A special issue of IEEE Network is guest-edited by DICONET partners on the relevant topics
- ONDM 2010 (February 2010, in Kyoto, Japan)
- OFC 2010 (March 2010 in San Diego, USA)
- CTTE 2010 (June 2010, in Ghent, Belgium)
- ICTON 2010 (June 2010, in Munich, Germany)

### 2.1.2 Dissemination at Concertation and Cluster Meetings

The DICONET project actively participated at Concertation and Cluster meetings arranged by EC. It allowed the project to share his vision through the EC community

- The events that have been attended from the project start in January 2008 till the end of July 2010 are:
  - **The Future of Internet** – [www.fi-bled.eu/]  
31 March – 4 April 2008, Bled, Slovenia
  - **ICT-Mobile Summit 2008** [http://www.ict-mobilesummit.eu/2008/]  
10 - 12 June 2008, Stockholm, Sweden
  - The 2nd FP7-FP6 Concertation Meeting “**The Network of the Future**”  
September 30 & October 1-2, 2008, Brussels, Belgium

- **ICT-2008 Event**, 25-27 November 2008, Lyon, France  
[[http://ec.europa.eu/information\\_society/events/ict/2008/index\\_en.htm](http://ec.europa.eu/information_society/events/ict/2008/index_en.htm)]
- **The Future of Internet** - [[www.future-internet.eu/home/future-internet-assembly/madrid-dec-2008.html](http://www.future-internet.eu/home/future-internet-assembly/madrid-dec-2008.html)]  
9 – 10 December 2008, Madrid, Spain
- **The 3rd Concertation Meeting of ICT-FP7-FP6** “The Network of the Future”  
17 February, 2009, Brussels, Belgium
- **Future Internet Assembly** [[www.fi-prague.eu/](http://www.fi-prague.eu/)]  
11-13 May 2009, Prague, Czech Republic
- **ICT-MobileSummit 2009** [<http://www.ict-mobilesummit.eu/2009/>]  
10 - 12 June 2009, Santander, Spain
- **The 4th FP7-FP6 Concertation meeting** “The Network of the Future”  
29th September 2009, Brussels, Belgium
- **Future Internet Assembly** [[www.fi-stockholm.eu](http://www.fi-stockholm.eu)]  
23-24 November 2009, Stockholm, Sweden
- **Future Networks 5th FP7 Concertation meeting**  
26-28 January, 2010 in Brussels, Belgium
- **Future Internet Assembly- FIA** [[http://www.r2sconference.eu/sideEvents\\_fia.php](http://www.r2sconference.eu/sideEvents_fia.php)]  
April 15-16, 2010, in Valencia, Spain
- **Future Network & Mobile Summit 2010**  
(<http://www.futurenetworksummit.eu/2010/>)  
16 - 18 June 2010, Florence, Italy

### 2.1.3 Connections with Technology Platforms

Close collaboration with the European Technology Platforms (ETPs – e.g. NEM) and the various think-tanks (e.g. EIFFEL group) established by EU are fostered. Several partners and individual members of our consortium are closely following the activities of the ETPs and therefore assist in relevant dissemination.

DICONET has been represented in the FIRE and EIFFEL initiatives of the EC: Jean-Charles Point participated to the EIFFEL think tank meeting (Frankfurt, 30 September - 1 October 2008) and to the FIRE technical expert group meetings (Paris, 10-11 Sept 2008, Brussels 8-9 Jan 2009). A poster of DICONET activities has been presented during the 2008 NEM summit [<http://www.nem-summit.eu/>] held on 13-15 October 2008, Saint-Malo, France. DICONET was also represented at **2009 NEM summit** [<http://www.nem-summit.eu/>] to be held in September 28-30, 2009, Saint-Malo, France so as the **2010 NEM summit** [13- 15 oct. 2010 to be held in Barcelona, Spain- <http://nem-summit.eu/>]

### 2.1.4 Dissemination through other relevant projects

The active communication and interactions with other EU and National projects were undertaken in order to promote the dissemination of the project activities and outcomes.

Close contacts with other FP7 projects and with other international projects were undertaken and the benefits DICONET could gain or will provide are further detailed in the table below:

Project	DICONET Partners Involved	Benefit for DICONET Benefit from DICONET
<p><b>BONE</b> FP7 – Call 1 Start date: 1/1/2008 End date: 31/12/2010 Duration: 36 Months</p>	<p>IBBT, AIT, HUAWEI, UEssex, UPC, .....</p>	<p>In the framework of BONE project (a Network of Excellence with specific focus on optical networking) there is a particular work package (i.e. WP26) which is dedicated to the research activities with focus on alternatives for multi-layer networking with cross-layer optimization: This work package combines a large number of partners currently working on various research fields interoperable to each other. The long term focus is to define the possible future solutions for converged IP/Ethernet over optical layer and create a common platform for the protocol and algorithm designs that will result in optimised solutions. Therefore, multi-layer as well as multi-domain issues can be handled both faster and in a more efficient way within the European networks. More specifically there are two joint activities in this WP, which consider the impact of physical layer impairments on the routing and wavelength assignment and regenerator placement in transparent and translucent optical networks. These joint activities pave the way for DICONET partners to integrate with other research groups and increase the quality of the R&amp;D outcomes.</p> <p>Most of the DICONET partners are also actively participating in BONE. The participation provides the important opportunity for other involved partners to be aware of relevant activities in DICONET and utilize its outcomes in joint activity researches. In general the bilateral joint activities boost the quality level of research and development activities.</p>

<p><b>COST-291</b> Start date: 2005 End date: 2009</p>	<p>AIT, UPC</p>	<p>A key activity of COST 291 was focusing on the topic of impairment aware optical networking. At the initial stages of this project (coordinated by AIT), some initial studies were performed that set the basis also for the DICONET project scope. Once the DICONET project started, the exchange of information among the two projects was frequent and as a result of the collaboration a joint book chapter appeared in the final report of COST 291 (Siamak Azodolmolky, Tibor Cinkler, Dimitris Klonidis, Zsigmond Szilard, Ioannis Tomkos, “Cross-layer optimization issues for realizing transparent mesh optical networks”, COST291 – Towards Digital Optical Networks, Final report, part II, chapter 6, 2009).</p>
<p><b>SARDANA</b> FP 7 – Call 1 Start date: 1/1/2008 End date: 31/12/2010</p>	<p>AIT</p>	<p>The SARDANA project, like DICONET, had a research task focusing on optical performance/impairment monitoring techniques for converged metro/access optical networks. Therefore, there was an exchange of information among the two projects on the relevant topics, benefiting both projects. As a result of this collaboration a joint survey/review paper was prepared (D. Dahan, U. Mahlab, A. Teixeira, and I. Tomkos, “A review of optical performance monitoring techniques for dynamic transparent optical networks”, IET Journal of Optoelectronics, 2010).</p>
<p><b>CHRON</b> FP 7 – Call 5 Start date: 1/7/2010 End date: 31/6/2013</p>	<p>AIT, HUAWEI, Create-Net</p>	<p>The CHRON project, following the completion of DICONET will exploit the expertise and outcome of the DICONET project as it involves three partners out of the DICONET consortium. CHRON project that deals with optical networking concepts in cognitive heterogeneous networks, can benefit from the knowledge and output developed in DICONET in several topics such as: optical monitoring, the development of a QoT estimator, control plane extensions, integration of the various models in the control plane emulated testbed, developed interfaces and techno-economic analysis.</p>

<b>PHOSPHORUS</b> FP 6 – Call 5 Start date: 01/10/2006 End date: 30/06/2009	AIT, CTI, ADVA	Understanding issues related to routing algorithms for optical networks
<b>NOBEL I</b> Start date: 1/2004 End date: 12/2005	IBBT, UPC, DTAG	Reuse of cost model, that is updated in DICONET
<b>NOBEL II</b> Start date: 03/2006 End date: 02/2008	IBBT, UPC, DTAG	Reuse of cost model, that is updated in DICONET
<b>ALPHA &amp; OASE</b> Start Date: 01/2008 End Date: 12/2010	IBBT	Reuse of expertise in TCO modeling activities
<b>National project: FWO G.057808</b> Start Date:2008 End Date: 2011	IBBT	Reuse of expertise on design of robust transparent optical network
<b>DRAGON</b> USA NSF	CN, HUAWEI	Dynamic Resource Allocation via GMPLS Optical Networks project was funded by NSF in USA. The aim of the project was to develop and demonstrate hybrid packet and circuit switched network infrastructure with the emphasis on open source GMPLS software. DICONET project used open source software from the DRAGON project for implementation of hybrid and PCE based architecture and their evaluation.
<b>METEOR – FP5</b> Start Date:01/2000 End Date:06/2006	ECI	Optical Monitoring for High Bit Rate.

### 2.1.5 Publications, magazines etc

Relevant publications like technical magazines, IEEE transactions as well as newspapers were used to disseminate project visions and results. Though we focus on technical publications, it is assumed to be quite as important to address commercial publication as well as those addressing the general public.

All partners contributed in the writing of a Press Release that can be found on the partners' websites, as well as on the Cordis website; in addition, independent publications expressed their intention to relay information about the DICONET project when results are concretised.

Publications that are prepared, proposed and or accepted are listed in the table below

Authors	Paper title/ Tutorial title	Name of journal, conference, etc.	Vol., no., pages, location	Date	Ref (Y/N)
I.Tomkos	Network Planning for Dynamic Impairment Constraint Optical Networking: The Activities of DICONET EU Project.	OFC/NFOEC 2008 Planning Tools for Transparent Optical and Multilayer Networks (OsUc) Workshop	N/A	24 Feb. 08	N
I.Tomkos, S. Azodolmolky, D. Klonidis, M.Angelou, K. Margariti	Dynamic Impairment Aware Networking for Transparent Mesh Optical Networks: Activities of EU project DICONET	ICTON 2008 (Conference)	Vol. 1, pp. 6-12. Athens, Greece	22-26 June 08	Y
T. Zami	Robustness of Quality of Transmission Estimators for IC-RWA to Uneven Channel Powers in Core Optical Networks	ICTON 2008	TuB1.3, Athens, Greece	22-26 June 2008,	N
D. Monogios, K. Vlachos	On the use of genetic algorithms for solving the RWA problem employing the maximum quantity of edge disjoint paths	ICTON 2008	Vol 3., pp 154-157 Athens, Greece	22-26 June 2008,	Y
K. Manousakis, K.Christodoulou poulos, E. Varvarigos	Avoiding Adjacent Channel Interference in Static RWA	CNSDSP 2008	pp. 552-556 Graz, Austria	23-25 July 2008,	Y
K.Christodoulou poulos, K.Manousakis, E. Varvarigos	Comparison of Routing and Wavelength Assignment Algorithms in WDM Networks	IEEE GLOBECOM 2008	ON04W1-2 New Orleans, U.S.A.,	30 Nov. – 3 Oct, 2008	Y

Authors	Paper title/ Tutorial title	Name of journal, conference, etc.	Vol., no., pages, location	Date	Ref (Y/N)
T. Zami, A. Morea, F. Leplingard, N. Brogard	The relevant impact of the physical parameters uncertainties when dimensioning an optical core transparent network	ECOC 2008	Paper Wed.3.D.2, Brussels, BELGIUM	24 Sept. 2008	N
I. Tomkos, S.Azodolmolky, M. Angelou, D. Klondis, Y. Ye, C.V. Saradhi, E. Salvadori, A. Zanardi, R. Piesiewicz	Impairment Aware Networking and Relevant Resiliency Issues in All-Optical Networks	ECOC 2008	Vol.3, pp 183-186, Wed.3.D.1, Brussels, BELGIUM	24 Sept. 2008	N
K.Christodouloupoul os, K. Manousakis, E. A. Varvarigos M. Angelou, I. Tomkos	A Multicost Approach to Online Impairment-Aware RWA	IEEE ICC 2009	To appear Dresden, Germany	Jun 14-18, 2009,	Y
K. Vlachos A. Siokis	A Service- Transparent and Self-Organized Optical Network Architecture	IEEE ICC 2009	To appear Dresden, Germany	Jun 14-18, 2009,	N
K. Vlachos, D. Monoyios, M. Angelou, I. Tomkos	On the use of Multi- Objective Optimization Algorithms for solving the Impairment Aware- RWA problem	IEEE ICC 2009	To appear Dresden, Germany	Jun 14-18, 2009,	Y
S. Azodolmolky, Y. Pointurier, M. Angelou, J. Solé Pareta, and I. Tomkos	An Offline Impairment Aware RWA Algorithm with Dedicated Path Protection Consideration	IEEE/OSA Optical Fiber Communication Conference (OFC)	San Diego, CA, USA	24-26 March 2009	Y
K. Manousakis, K.Christodouloupoul os, E. Varvarigos	Impairment-Aware Offline RWA for Transparent Optical Networks	IEEE INFOCOM 2009	To appear Rio De Janeiro, Brazil	April 19- 25, 2009,	Y

Authors	Paper title/ Tutorial title	Name of journal, conference, etc.	Vol., no., pages, location	Date	Ref (Y/N)
S. Azodolmolky M. Klinkowski E. Marin D. Careglio, J. Solé Pareta, I. Tomkos	A Survey on Physical Layer Impairments Aware Routing and Wavelength Assignment Algorithms in Optical Networks	Computer Network journal	Volume 53, Issue 7, Pages 926- 944	May 2009	Y
M. Yannuzzi, M. Quagliotti, G. Maier, E. Marín-Tordera, X. Masip-Bruin, S. Sánchez-López, J. Solé-Pareta, W. Erangoli, G. Tamiri	Performance of translucent optical networks under dynamic traffic and uncertain physical- layer information	13th International Conference on Optical Networking Design and Modeling (ONDM 2009)	Braunschwei g, Germany	18-20 February 2009	Y
V. S. Chava S. Subramaniam	Physical Layer Impairment Aware Routing (PLIAR) in WDM Optical Networks: Issues and Challenges	IEEE Communication s Society Surveys and Tutorials	To appear	2009	Y
V. S. Chava A. Zanardi, S. Dalsass, E. Salvadori and R. Piesiewicz	Performance of Impairment Aware End-to-End Failure Recovery in Transparent WDM Optical Networks	IEEE/OSA Optical Fiber Communication Conference (OFC)	To appear	24-26 March 2009	Y
F. Leplingard, A. Morea, T. Zami, N. Brogard	Interest of an Adaptive Margin for the Quality of Transmission Estimation for Lightpath Establishment	IEEE/OSA Optical Fiber Communication Conference (OFC)	San Diego, CA, USA	24-26 March 2009	Y
S. Azodolmolky, M. Klinkowski, E. Marin, D. Careglio, J. Solé-Pareta, Y. Pointurier, M. Angelou, I. Tomkos	On The Offline Physical Layer Impairment Aware RWA Algorithms in Transparent Optical Networks: State-of- the-Art and Beyond	13th International Conference on Optical Networking Design and Modeling (ONDM 2009) [invited paper]	Braunschwei g, Germany	18-20 February 2009	Y

Authors	Paper title/ Tutorial title	Name of journal, conference, etc.	Vol., no., pages, location	Date	Ref (Y/N)
A. Morea, T. Zami, F. Leplingard	Introduction of Confidence Levels for Transparent Network Planning	ECOC'2009	Vienna, Austria	Sept. 2009	
V. S. Chava , E. Salvadori, A. Zanardi, S. Dalsass, R. Piesiewicz, I. Tomkos.	Control Plane Issues in Cross-layer Optimized Dynamic Optical Networks	ICTON'2009 [invited]	Azores, Portugal	Jun/July 2009	Y
V. S. Chava , E. Salvadori, A. Zanardi, S. Dalsass, R. Piesiewicz.	Impairment aware GMPLS-based control plane architectures to realize dynamically reconfigurable transparent optical networks	Photonics in Switching	Pisa, Italy	Sept. 2009	Y
V. S. Chava , E. Salvadori, A. Zanardi, S. Dalsass, R. Piesiewicz.	Hybrid control plane architecture for dynamic impairment-aware routing in transparent optical networks	Photonics in Switching	Pisa, Italy	Sept. 2009	Y
N. Sambo, Y. Pointurier, F. Cugini, P. Castoldi, I. Tomkos	Lightpath establishment in PCE-based dynamic transparent optical networks assisted by end-to-end Quality of Transmission estimation	ICTON 2009	Azores, Portugal	Jun. 2009	N
N. Sambo, Y. Pointurier, F. Cugini, L. Valcarenghi, P. Castoldi, I. Tomkos	Lightpath establishment in distributed transparent dynamic optical networks using network kriging	ECOC 2009	Vienna, Austria	Oct. 2009	Y
I. Tomkos	Impairment aware dynamic optical circuit switched networks	Photonics in Switching	Pisa, Italy	Sept. 2009	N

Authors	Paper title/ Tutorial title	Name of journal, conference, etc.	Vol., no., pages, location	Date	Ref (Y/N)
D. Staessens, D. Colle, M. Pickavet, P. Demeester	Cost efficiency of protection in future transparent networks	ICTON2009	Azores, Portugal	June 2009	Y
D. Staessens, D. Colle, M. Pickavet, P. Demeester	Dissemination of Monitoring Information in Transparent Optical Networks	ECOC2009	Vienna, Austria	Septembe r 2009	Y
P. Kokkinos, K.Christodouloupoulos, K. Manousakis, E. Varvarigos	Multi-Parametric Online RWA based on Impairment Generating Sources	Globecom 2009	Honolulu, Hawaii	Nov-Dec, 2009	Y
K.Christodouloupoulos, K. Manousakis, E. Varvarigos, M. Angelou	Considering Physical Layer Impairments in Offline RWA	IEEE Network Magazine, Special Issue on: "Protocols and Algorithms for Future Cross-Layer and Hybrid Optical Networks"			Y
K. Manousakis, K. Kamitsas, K.Christodouloupou los, I. Tomkos, E. Varvarigos	Offline Impairment Aware Routing and Wavelength Assignment Algorithms in Translucent WDM Networks	IEEE/OSA Journal of Lightwave Technology			Y
U. Mahlab E. Dolev D. Dahan	Optical network link design as an optimization problem.	Optical communication conference , University of Ljubljana	Ljubljana Slovenia	Jan 2010	Y
M. Youssef, S. Al Zahr, M. Gagnaire	Cross Optimization for RWA and Regenerator Placement in Translucent WDM Networks	ONDM 2010		Jan. 31 - Feb. 3, 2010	Yes

Authors	Paper title/ Tutorial title	Name of journal, conference, etc.	Vol., no., pages, location	Date	Ref (Y/N)
S. Azodolmolky, Y. Pointurier, M. Angelou, J. Solé-Pareta, I. Tomkos	Routing and Wavelength Assignment for Transparent Optical Networks with QoT Estimation Inaccuracy	OFC 2010	OMM4	21-25 March 2010	Yes
Y. Qin, Y. Pointurier, E. Escalona, S. Azodolmolky, M. Angelou, I. Tomkos, K. Ramantas, K. Vlachos, R. Nejabati1 D. Simeonidou,	Hardware Accelerated Impairment Aware Control Plane	OFC 2010		21-25 March 2010	Y
F. Agraz, S. Azodolmolky, M. Angelou, J. Perelló, L. Velasco, S. Spadaro, A. Francescon, C. V. Saradhi, Y. Pointurier, P. Kokkinos, E. Varvarigos, M. Gunkel and I. Tomkos,	“Experimental Demonstration of Centralized and Distributed Impairment- Aware Control Plane Schemes for Dynamic Transparent Optical Networks,”	OFC 2010	PDPD5	21-25 March 2010	Y
W. Van Heddeghem, M. De Groote, W. Vereecken, D. Colle, M. Pickavet and P. Demeester,	"Energy- Efficiency in Telecommunicatio ns Networks: Link-by-Link versus End-to-End Grooming,"	ONDM 2010		Jan. 31 - Feb. 3, 2010	Y

Authors	Paper title/ Tutorial title	Name of journal, conference, etc.	Vol., no., pages, location	Date	Ref (Y/N)
P. Henri, Chr. Simonneau, F. Leplingard, JC. Antona, L. Lorcy	“Experimental investigation of the quality of transmission in transparent mesh networks with mixed fiber types”	OFC 2010	JthA1	21-25 March 2010	Y
A. Morea, D. Verchere, F. Leplingard	Improved Aggregated Impairment Information for Bi-directional Lightpath Establishments	OFC 2010	OMU4	21-25 March 2010	Y
V. S. Chava , S. Zaks, R. Fedrizzi, A. Zanardi and E. Salvadori	Practical and Deployment Issues to be Considered in Regenerator Placement and Operation of Translucent Optical Networks	ICTON 2010	Munich, Germany	Jun-Jul 2010	Y
A. Morea J.C. Antona.	Benefits of fine QoT-estimator to dimension spare resources in automatic restorable networks	ICTON 2010	Munich, Germany	Jun-Jul 2010	Y
Y. Qin, K.C.S. Cheng, J. Triay, E.Escalona, G. S. Zervas, G.Zarris, N. Amaya- Gonzalez, C. Cervell ́o- Pastor, R.Nejabati and D. Simeonidou	Demonstration of C/S based Hardware Accelerated QoT Estimation Tool in Dynamic Impairment- Aware Optical Network	ECOC 2010			Y

Authors	Paper title/ Tutorial title	Name of journal, conference, etc.	Vol., no., pages, location	Date	Ref (Y/N)
E. Escalona, Y. Qin, G. S. Zervas, J. Triay, G. Zarris, N. Amaya- Gonzalez, R. Nejabati, C. Cervelló-Pastor & D. Simeonidou	Experimental Demonstration of a Novel QoS- Aware Hybrid Optical Network	ECOC 2010			Y
G. S. Zervas, G. Zarris, N. Amaya- Gonzalez, J. Triay, E. Escalona, Y. Qin, C.Cervello-Pastor, R. Nejabati & D.Simeonidou	Experimental Demonstration of a Self-Optimised Multi-Bit-Rate Optical Network	ECOC 2010			Y
D. Dahan, U. Mahlab, A. Teixeira, I. Zacharopoulos and I. Tomkos	Optical Performance Monitoring for Translucent/Trans parent Optical Networks	IET Optoelectronics		To be published	Y
E. Doumith, S. Al Zahr, M. Gagnaire	Monitoring-tree: an innovative technique for failure localization in WDM translucent networks	IEEE Globecom 2010, Miami- USA, December 2010.		Decembe r 8-10, 2010.	Y
A. Haddad, A. Doumith, M. Gagnaire	A meta-heuristic approach for monitoring -trails assignment in WDM optical networks	IEEE RNDM 2010, Moscow, Russia, October 2010.		October 18-20, 2010.	Y

The list of scientific (Peer reviewed) publications is available page 18

### 2.1.6 Project Website

This DICONET website ([www.DICONET.eu](http://www.DICONET.eu)) has been set up just after the kick off meeting and was officially delivered to the EC (Deliverable D7.0) in January, 2008. This website has been regularly updated with all public information and was intended to facilitate contacts and exchanges with other research and industrial initiatives on the relevant topics. This web site has been continuously kept updated about general public project information, public deliverables and other results that may interest the public. Our intention was to present valuable information about the general news in the area, the events in the domain and the important headings of the European Commission and other related projects.

### 2.1.7 Liaison and dissemination in the appropriate standard bodies

See the “Control Plane Extensions and Standardization (T7.2)” document provide as Annex 1 to this report.

### 2.1.8 Universities and colleges

In total 7 of the partners in the project have close relations to university and colleges. These partners ensure that project visions and results are disseminated among educational staff and students. The intention is that project ideas are included in different training activities as student projects, incorporation into lectures etc.

**AIT** hired 2 Ph.D. students specifically to participate in the DICONET project (including 1 female student) and 3 M.S. students, 2 of which will write a thesis on a topic directly related to DICONET, and 1 will participate in DICONET as a research assistant supervised by AIT faculties. In addition, outcomes and issues of the DICONET project were presented to the student body during a research seminar, and a faculty from AIT held a session on the DICONET topics during the EUROFOS summer school on July 9, 2009.

**Create-NET** assigned one post doc on part-time basis for the DICONET project. One software developer was working on part-time basis for the project. Two junior researchers were recruited for the purposes of the DICONET project. The expertise Create-Net gained through DICONET project helped in acquiring an industrial project from the major network/system vendor in the topics related to DICONET. Create-Net was also involved in several dissemination activities including a special issue in IEEE Network Magazine, and invited talks at Broadnets and ICTON conferences. Through internal discussions and brainstorming with these people, a few other persons became aware of the technical content of DICONET. Several other people started working on related industrial projects through the expertise gained through DICONET project.

**CTI** assigned one project manager, 1 research staff, two post docs and four junior researchers in the DICONET project. From this group of people 1 research staff, 1 post doc and 2 researches were working full time, while the others part time. These two junior researchers will write a thesis on a topic directly related to DICONET. Selected results from the research in DICONET will be used for updating the material of existing courses.

**IBBT**, on a short term basis, already involved one PhD student in DICONET: the dissertation that will come out will cover issues directly related to DICONET. In addition, one project engineer and three post-doc researchers are involved and thus gained knowledge

on DICONET related issues. Through internal discussions and brainstorming with these people, a few other persons became aware of the technical content of DICONET.

On a longer-term, the IBCN research group (part of IBBT) will include this expertise in the master courses it is responsible for at Ghent University: the courses “Communicatienetwerken” (3rd bachelor year in Computer Science Engineering and Electro-technical Engineering and in Informatics) and “Multimedianeetwerken” (1st master year) reaching yearly around 80 students are the best candidates for integrating the knowledge gained through the DICONET project. This opens the opportunity for further training of professionals in this field and possibly starting other PhDs in this area.

**Telecom ParisTech** has recruited a Ph.D student (Female) for three years and two internships for 6 months during the duration of the project. Two research engineers (Ph.Ds) have worked part-time during the whole duration of the project. A tutorial on translucent networks has been provided at the Networks 2008 conference in Budapest. An invited paper will be presented at the Photonics conference to be held in Singapore in December 2010 on the same topic. A 3 hours course on IA-RWA has been included in the MSc curriculum of Telecom ParisTech dedicated to High Speed optical networks. A European patent on failure localization and monitoring in optical networks has been published in March 2010. A testbed aiming to serve as a proof-of-concept of this patent will be installed in our laboratories during the year 2011.

**UESSEX** assigned two research staffs in the DICONET project. One of whom is dedicated for the project. The DICONET project was well presented to the large amount of visitors of undergraduate students of the school, internal and external scholars, and university exchanging and industry researchers.

**UPC** is including selected results from the research activities in University curricula in order to prepare the next generation of skilled scientist/engineers. This can be achieved, for example, by updating the material of existing courses with results coming from the project and by organizing short courses for PhD students on specific topics. This is of great importance in order to guarantee continuity, to educate the next generation of skilled engineers as well as to foster a long-term, sustainable technological lead and excellence within European Union.

## ***2.2 Partner internal dissemination***

All partners in the project will disseminate project results internally in their organizations (through their own communication tools: newsletter, website, ...)

### 2.3 List of scientific (peer reviewed) publications

LIST OF SCIENTIFIC (PEER REVIEWED) PUBLICATIONS, STARTING WITH THE MOST IMPORTANT ONES

NO.	Title	Main author	Number, date or frequency	Publisher	Year of publication
1	A Survey on Physical Layer Impairments Aware Routing and Wavelength Assignment Algorithms in Optical Networks Elsevier	S. Azodolmolky, M. Klinkowski, E. Marin, D. Careglio, J. Sole-Pareta, I. Tomkos	ISSN: 1389 -1286	Elsevier	2009
2	A Dynamic Impairment Aware Networking Solution for Transparent Mesh Optical Networks	Siamak Azodolmolky, Dimitris Klonidis, Ioannis Tomkos, Yabin Ye, Chava Vijaya Saradhi, Elio Salvadori, Matthias Gunkel, K. Manousakis, K. Vlachos, and E. Varvarigos, Reza Nejabati, Dimitra Simeonidou, Michael Eiselt, Jaume Comellas, Josep Solé-Pareta, Christian Simonneau, Dominique Bayart, Dimitri Staessens,		IEEE Communication Magazine	2009

		Didier Colle, Mario Pickavet			
3	Offline Impairment Aware RWA Algorithms for Cross-Layer Planning of Optical Networks	P. Pavon-Mariño, S. Azodolmolky, R. Aparicio-Pardo, B. Garcia-Manrubia, Y. Pointurier, M. Angelou, J. Solé Pareta, J. Garcia Haro, I. Tomkos		IEEE Journal of Lightwave Technologies	2009
4	Experimental Demonstration of an Impairment Aware Network Planning and Operation Tool for Transparent/Translucent Optical Networks	S. Azodolmolky, J. Prelo, M. Angelou, F. Agraz, L. Velasco, S. Spadaro, Y. Pointurier, Antonio Francescon, Chava Vijaya Saradhi, Panagiotis Kokkinos, Emmanouel (Manos) Varvarigos, Sawsan Al Zahr, Maurice Gagnaire, Matthias Gunkel, Dimitris Klioni and Ioannis Tomkos		IEEE Journal of Lightwave Technologies	2010
5	Impairment Aware Routing and Wavelength Assignment in Translucent Networks: a State of the Art	M. Gagnaire, S. Al Zahr		IEEE Communication Magazine	2009
6	Robustness of Quality of Transmission Estimators for IC-RWA to Uneven Channel Powers in Core Optical Networks	Thierry Zami		ICTON 2008 (Conference)	2008
7	Avoiding Adjacent Channel Interference in Static RWA	K. Manousakis, K.Christodouloupoulos, E. Varvarigos		CNSDSP 2008 (Conference)	2008
8	The relevant impact of the physical parameters uncertainties When dimensioning an optical core transparent network	Thierry Zami, Annalisa Morea, Florence Leplingard, Nicolas Brogard		ECOC 2008	2008
9	Comparison of Routing and Wavelength Assignment Algorithms in WDM Networks	K.Christodouloupoulos, K. Manousakis, E. Varvarigos		IEEE GLOBECOM 2008 (Conference)	2008
10	Interest of an Adaptive Margin for the Quality of Transmission	Florence Leplingard, Annalisa Morea, Thierry Zami, Nicolas Brogard		IEEE Communications	

	Estimation for Lightpath Establishment			Society Surveys and Tutorials	
11	Physical Layer Impairment Aware Routing (PLIAR) in WDM Optical Networks: Issues and Challenges	Chava Vijaya Saradhi and Suresh Subramaniam		IEEE Communications Society Surveys and Tutorials	2009
12	Performance of Impairment Aware End-to-End Failure Recovery in Transparent WDM Optical Networks	Chava Vijaya Saradhi, Andrea Zanardi, Sergio Dalsass, Elio Salvadori, and Radoslaw Piesiewicz		OFC/NFOEC 2009	2009
13	An Offline Impairment Aware RWA Algorithm with Dedicated Path Protection Consideration	Siamak Azodolmolky, Yvan Pointurier, Marianna Angelou, Josep Sole-Pareta, Ioannis Tomkos		OFC/NFOEC 2009	2009
14	Impairment-Aware Offline RWA for Transparent Optical Networks	K. Manousakis, K.Christodouloupoulos, E. Varvarigos		IEEE ICC 2009	2009
15	On the use of Multi-Objective Optimization Algorithms for solving the Impairment Aware-RWA problem	K. Vlachos, D. Monogios, M. Angelou, I. Tomkos		IEEE ICC 2009	2009
16	A Multicost Approach to Online Impairment-Aware RWA	K. Christodouloupoulos, K. Manousakis, E. Varvarigos, M. Angelou, I. Tomkos		The Future of the Internet Conference, Prague, Czech Republic, May 2009	
17	DICONET: future generation transparent networking with dynamic impairment awareness	I. Tomkos, Y. Pointurier, S. Azodolmolky, Eiselt, T. Zami, R. Piesiewicz, C.V. Saradhi, M. Gunkel, U. Mahlab, M. Chen, Y. Ye, M. Pickavet, M. Gagnaire,		IEEE Communication Magazine	

		E. Varvarigos, J. Solé-Pareta, R. Nejabati, Y. Qin, and D. Simeonidou			
18	A Dynamic Impairment Aware Networking Solution for Transparent Mesh Optical Networks	Siamak Azodolmolky, Dimitris Klonidis, Ioannis Tomkos, Yabin Ye, Chava Vijaya Saradhi, Elio Salvadori, Matthias Gunkel, K. Manousakis, K. Vlachos, and E. Varvarigos, Reza Nejabati, Dimitra Simeonidou, Michael Eiselt, Jaume Comellas, Josep Solé Pareta, Christian Simonneau, Dominique Bayart, Dimitri Staessens, Didier Colle, Mario Pickavet		IEEE Communications Magazine, Special Issue on: "Protocols and Algorithms for Future Cross-Layer and Hybrid Optical Networks"	
19	Considering Physical Layer Impairments in Offline RWA	K. Christodoulopoulos, K. Manousakis, E. Varvarigos, M. Angelou		IEEE Network Magazine, Special Issue on: "Protocols and Algorithms for Future Cross-Layer and Hybrid Optical Networks"	
20	Offline Impairment Aware Routing and Wavelength Assignment Algorithms in Translucent WDM Networks	K. Manousakis, K. Kamitsas, K. Christodoulopoulos, I. Tomkos, E. Varvarigos		IEEE/OSA Journal of Lightwave Technology	
21	Identification of linear and nonlinear propagation regimes in an optical fiber link using chaos analysis	Roni Rachamim, Uri Mahlab, David Dahan		Optical engineering	2009

22	Multi-Parametric Online RWA based on Impairment Generating Sources	Panagiotis Kokkinos, Kostas Christodoulopoulos, Konstantinos Manousakis, Emmanouel Varvarigos		IEEE GLOBECOM 2009 (Conference)	2009
23	A Novel Offline Physical Layer Impairments Aware RWA Algorithm With Dedicated Path Protection Consideration	Siamak Azodolmolky, Mirosław Klinkowski, Yvan Pointurier, Marianna Angelou, Davide Careglio, Josep Solé-Pareta, and Ioannis Tomkos,		IEEE Journal of Lightwave Technologies	2009 (Under Review)
24	A Novel Impairment Aware RWA Algorithm with Consideration of QoT Estimation Inaccuracy	Siamak Azodolmolky, Yvan Pointurier, Marianna Angelou, Davide Careglio, Josep Solé-Pareta, and Ioannis Tomkos		IEEE/OSA Journal of Optical Communications and Networking	2009 (Submitted)
25	Cross Optimization for RWA and Regenerator Placement in Translucent WDM Networks	M. Youssef, S. Al Zahr, M. Gagnaire		ONDM 2010	Jan. 31 - Feb. 3, 2010
26	"Energy-Efficiency in Telecommunications Networks: Link-by-Link versus End-to-End Grooming,"	W. Van Heddeghem, M. De Groote, W. Vereecken, D. Colle, M. Pickavet, and P. Demeester,		ONDM 2010	Jan. 31 - Feb. 3, 2010
27	Routing and Wavelength Assignment for Transparent Optical Networks with QoT Estimation Inaccuracy	Siamak Azodolmolky, Yvan Pointurier, Marianna Angelou, Josep Solé-Pareta, and Ioannis Tomkos		OFC/NFOEC 2010	21-25 March 2010
28	Hardware Accelerated Impairment Aware Control Plane	Yixuan Qin, Yvan Pointurier, Eduard Escalona, Siamak Azodolmolky, Marianna Angelou, Ioannis Tomkos, Kostas Ramantas, Kyriakos Vlachos, Reza Nejabati and Dimitra Simeonidou		OFC/NFOEC 2010	21-25 March 2010
29	"Experimental Demonstration of Centralized and Distributed Impairment-Aware Control Plane Schemes for Dynamic Transparent Optical Networks,"	F. Agraz, S. Azodolmolky, M. Angelou, J. Perelló, L. Velasco, S. Spadaro, A. Francescon, C. V. Saradhi, Y. Pointurier, P.		OFC/NFOEC 2010	21-25 March 2010

		Kokkinos, E. Varvarigos, M. Gunkel, and I. Tomkos,			
30	Improved Aggregated Impairment Information for Bi-directional Lightpath Establishments	Annalisa Morea, Dominique Verchere, Florence Leplingard		OFC/NFOEC 2010	21-25 March 2010
31	Experimental investigation of the quality of transmission in transparent mesh networks with mixed fiber types	Pascal Henri, Christian Simonneau, Florence Leplingard, Jean-Christophe Antona, Laurence Lorcy		OFC/NFOEC 2010	21-25 March 2010
32	Optical Performance Monitoring for Translucent/Transparent Optical Networks	D. Dahan, U. Mahlab, A. Teixeira, I. Zacharopoulos and I. Tomkos		IET Optoelectronics	2010

### 3 PART 2 - Specifications of the exploitable foreground

This section provides the plans for exploitation. **It will be kept confidential** and will be treated as such by the Commission.

#### 3.1 List of applications for patents, trademarks, registered designs, etc.

<i>Type of IP Rights: Patents, Trademarks, Registered designs, Utility models, etc.</i>	<i>Application reference(s) (e.g. EP123456)</i>	<i>Subject or title of application</i>	<i>Applicant (s) as on the application</i>
Patent	Submitted to the European Patent Office in Munich on June, 30 <sup>th</sup> , 2009	Flexible optical transport system in the Terabit/s regime	Dr. Matthias Gunkel (Deutsche Telekom, Germany), Dr. Jochen Leibrich (University Kiel, Germany)
Patent	Submitted to the European Patent Office in Munich on March 15th, 2010 (EP10290134)	A method and a system for unambiguous failure localization in translucent optical networks preserving network	Elias Doumith, Ph.D., Sawsan Al Zahr, Ph.D., Maurice Gagnaire, Prof. (TELECOM ParisTech, France)

		capacity.	
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## ***3.2 Forecasted activities including exploitable foreground***

### **3.2.1 Exploitation plan -JCP**

JCP, in charge of the management and dissemination part of the project, does not perform any technical activity and as such has no particular exploitable foreground to report on. As JCP has a technical training portfolio, JCP is studying the possibility to add a training course on optical impairment monitoring and cross layer design in optical backbone.

### 3.2.2 Exploitation plan -AIT

AIT	WP3		WP4				WP5		WP6	WP7
	Monitoring	Q-tool	Offline IA-RWA	On Line - IA-RWA	Failure location algorithm	component placement	Interface between monitor and control plan	Network management and control protocol	FPGA concept	Techno-Economic analysis
<b>A-Patents</b>										
<b>B-Standards</b>										
<b>C- Products</b>										
<b>D- Research continuation</b>										
<i>D1-In other European funded programs</i>		(5)	(5)	(5)						(5)
<i>(a) With Universities</i>			(1)	(1)						
<i>(b) With industry</i>										
<i>D2-In other national funded programs</i>										
<i>(a) With Universities</i>										
<i>(b) With industry</i>										
<i>D3- In other self funded programs</i>		(2)	(3), (4)	(3), (4)						

*Comments and description of the exploitation plan*

Note Number	Description
(1)	In the framework of EU funded network of excellence project BONE, AIT as the leader of WP26 in BONE (Topical Project on Alternatives for multi-layer networking with cross-layer optimization) actively participated in the joint activities with other involved partners and provided its contribution to joint collaboration for design and performance evaluation of impairment aware routing and wavelength assignment algorithms for offline (planning) and online (operation mode) scenarios.
(2)	During the execution period of DICONET project AIT designed and developed a physical layer performance evaluator module (DICONET Q-Tool), which is able to evaluate the Quality of Transmission of lightpaths by computing the Q-Factor of the lightpaths. As an important outcome of DICONET, AIT will continue to perform further enhancement and upgrade to this tool and will enrich it with add-on features.
(3)	During the DICONET project AIT developed impairment aware routing and wavelength assignment algorithms for planning (offline) and operation mode (online) case of transparent optical networks. This algorithms will be further enhanced and in particular the multi-constraint IA-RWA algorithm, which is proposed of online case can be further enhanced to consider other constraints (e.g., Energy aware RWA).
(4)	AIT has utilized the outcome of DICONET by updating the material of existing courses with results coming from the DICONET and by organizing short courses and research seminars for M.Sc and PhD students on specific topics. This is of great importance in order to guarantee continuity, to educate the next generation of skilled engineers as well as to foster a long-term, sustainable technological lead and excellence within European Union.
(5)	AIT will utilize the experience and outcome of DICONET on physical layer modeling (Q-tool) offline and online , integration in the control plane, techno-economic analysis to apply it to the FP7 Call 5 EU Project CHRON that deals with optical networking concepts for cognitive heterogeneous core networks.

### 3.2.3 Exploitation plan -Create-NET

Create Net	WP3		WP4				WP5		WP6	WP7
	Monitoring	Q-tool	Offline IA-RWA	On Line - IA-RWA	Failure location algorithm	component placement	Interface between monitor and control plan	Network management and control protocol	FPGA concept	Techno-Economic analysis
<b>A-Patents</b>										
<b>B-Standards</b>								(2)		
<b>C- Products</b>										
<b>D- Research continuation</b>										
<i>D1-In other European funded programs</i>							(6)	(6)		
<i>(a) With Universities</i>							(1)(2)(3)(4)(5)(6)	(1)(2)(3)(4)(5)(6)		
<i>(b) With industry</i>										
<i>D2-In other national funded programs</i>										
<i>(a) With Universities</i>							(1)(2)(3)(4)(5)	(1)(2)(3)(4)(5)		
<i>(b) With industry</i>							(2)	(2)		

<i>D3- In other self funded programs</i>									
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*Comments and description of the exploitation plan*

Note Number	Description
(1)	Developed several optical control plane architectures and evaluated in WP2. These optical control plane architectures include both centralized and distributed architecture. In distributed architecture, three different OCP architectures are developed: RSVP-TE based architecture; OSPF-TE based architecture, and hybrid architecture. In centralized architecture, PCE based architecture is developed.
(2)	Several protocol extensions are developed for different control plane architectures developed in (1). Together with industrial (e.g. Huawei) and other partners these protocol extensions are presented in standardization bodies such as IETF.
(3)	Methods to handle potential active lightpath disruption are developed and evaluated the performance study. Several protocol messages required to handle remote Q-tool check is developed and corresponding extensions are defined.
(4)	These control plane architectures are implemented in simulation and emulation environment and several related papers are published in several reputed conferences.
(5)	Junior researchers are engaged in the development of optical control plane architecture and invited papers are presented at conferences to disseminate the knowledge developed in project.

(6)	<p>The optical control plane architecture developed during the DICONET project is devoted to a single domain. Several plans are made to extend the concept to multi-domain optical networks together with industry and academic partners. Some of the heterogenous networks concepts and Q-tool and OCP architectures will be used in CHRON project.</p>
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### 3.2.4 Exploitation plan -TPT

TPT	WP3		WP4				WP5		WP6	WP7
	Monitoring	Q-tool	Offline IA-RWA	On Line - IA-RWA	Failure location algorithm	component placement	Interface between monitor and control plan	Network management and control protocol	FPGA concept	Techno-Economic analysis
<b>A-Patents</b>					(1)					
<b>B-Standards</b>										
<b>C- Products</b>										
<b>D- Research continuation</b>										
<i>D1-In other European funded programs</i>	(2)				(2)	(2)				
<i>(a) With Universities</i>										

<i>(b) With industry</i>										
<i>D2-In other national funded programs</i>	(3)				(3)					
<i>(a) With Universities</i>										
<i>(b) With industry</i>										
<i>D3- In other self funded programs</i>										

*Comments and description of the exploitation plan*

Note Number	Description
(1)	A patent, entitled "A method and system for unambiguous failure localization in translucent optical network preserving network capacity", has been submitted to the European Patent Office in Munich on March 15th, 2010. It deals with single failure detection and localization in translucent WDM networks. The proposed method, called <i>m-trees</i> for " <i>monitoring trees</i> ", takes advantage from the broadcasting capability of an optical network node for achieving an unambiguous failure localization. It requires a single diode laser and aims at minimizing the number of required monitors while consuming the minimum number of supervisory channels.
(2)	Optimization problems related to monitoring, failure localization, and component placement in the context of the ITEA European project EASI-Clouds that stands for Extendable Architecture and Service Infrastructure for Cloud-aware software: EASI-Clouds has for target to develop a cloud computing reference architecture that builds on and exploits the clouds undertaken in the various countries presented in the consortium. This reference architecture will be designed subject to their different business and cloud service requirements. In addition, it will build on the most appropriate

	open source software and technologies.
(3)	Optimization problems related to monitoring and failure localization in the context of the National Project Compatible One: The aim of Compatible One is to provide an Open Source Cloudware that enables to deploy and manage private, public and hybrid Clouds. Compatible One has the challenge to ensure the interoperability between existing Clouds on one hand and new Clouds on the other hand.

### 3.2.5 Exploitation plan -Huawei

Huawei	WP3		WP4				WP5		WP6	WP7
	Monitoring	Q-tool	Offline IA-RWA	On Line - IA-RWA	Failure location algorithm	component placement	Interface between monitor and control plan	Network management and control protocol	FPGA concept	Techno-Economic analysis
<b>A-Patents</b>										
<b>B-Standards</b>	(1)	(1)						(1)		
<b>C- Products</b>	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)

<b>D- Research continuation</b>										
<u>D1-In other European funded programs</u>										
(a) With Universities										
(b) With industry	(3)	(3)								
<u>D2-In other national funded programs</u>										
(a) With Universities										
(b) With industry										
<u>D3- In other self funded programs</u>										

*Comments and description of the exploitation plan*

Note Number	Description
(1)	Huawei as the task leader of the standardization activities submitted one ITU-T draft on monitoring with title “Comments on the monitoring speed”; two ITU-T drafts on physical impairments modeling from Q-Tool with titles “Considerations for Interactions of PMD and Filtering effects with nonlinear effects in optical transmissions” and “Suggestions on procedures to build physical impairments models for signal quality evaluation”. Huawei also submitted one IETF draft to promote the control plane protocol extensions of the PCE approach with title “OSPF Extensions in Support of Impairment Aware Routing and Wavelength Assignment in Wavelength Switched

	Optical Networks”. Huawei also plans to submit another IETF draft to promote the control plane protocol extensions of the Hybrid approach later.
(2)	<p>The results of WP5 on protocol extensions for physical impairments have been discussed internally on applicability to Huawei’s WSON product line.</p> <p>All the results and deliverables of DICONET have been sent to related colleagues in the research department for discussions.</p>
(3)	The optical monitoring technologies studied in DICONET are mainly on direct-detection system. In the new funded CHRON project, optical monitoring technologies based on coherent detection will be studied. In DICONET, we built models for 10G NRZ systems. While in CHRON project, 40G DQPSK and 100G PDM-QPSK systems will be investigated and modeled.

### 3.2.6 Exploitation plan -IBBT

IBBT	WP3		WP4				WP5		WP6	WP7
	Monitoring	Q-tool	Offline IA-RWA	On Line - IA-RWA	Failure location algorithm	component placement	Interface between monitor and control plan	Network management and control protocol	FPGA concept	Techno-Economic analysis
<b>A-Patents</b>										
<b>B-Standards</b>										
<b>C- Products</b>										
<b>D- Research continuation</b>										
<i>D1-In other European funded programs</i>			(3)	(3)						(1)(2)(4)
<i>(a) With Universities</i>										
<i>(b) With industry</i>										
<i>D2-In other national funded programs</i>										
<i>(a) With Universities</i>										
<i>(b) With industry</i>										
<i>D3- In other self funded programs</i>					(5)		(6)			(5)

*Comments and description of the exploitation plan*

Note Number	Description
(1)	Definition of a WSS based semi-active PON architecture in the ALPHA/OASE projects based on the OXC architectures defined in DICONET
(2)	Cost model for STRONGEST based on DICONET CAPEX/OPEX cost model
(3)	IA-RWA techniques can be used for improving energy efficiency through RWA, this is an activity to be started in the STRONGEST project
(4)	Directional node architectures may need special extensions OpenFlow extensions, activity within SPARC project.
(5)	In the Flemish FWO project FWO G057808 multi-domain aspects of the DICONET failure localization algorithm and node directionality will be investigated.
(6)	IBBT will use the PCE implementation developed in WP2/WP5 for internal research



### 3.2.7 Exploitation plan -RACTI

RACTI	WP3		WP4				WP5		WP6	WP7
	Monitoring	Q-tool	Offline IA-RWA	On Line - IA-RWA	Failure location algorithm	component placement	Interface between monitor and control plan	Network management and control protocol	FPGA concept	Techno-Economic analysis
<b>A-Patents</b>										
<b>B-Standards</b>										
<b>C- Products</b>										
<b>D- Research continuation</b>										
<i><u>D1-In other European funded programs</u></i>										
<i>(a) With Universities</i>			(1)	(1)						
<i>(b) With industry</i>										
<i><u>D2-In other national funded programs</u></i>										
<i>(a) With Universities</i>			(2)	(2)						
<i>(b) With industry</i>										
<i><u>D3- In other self funded programs</u></i>			(3)	(3)						

*Comments and description of the exploitation plan*

Note Number	Description
(1)	<p>RACTI in the context of the WP4 of the DICONET project, developed impairment aware routing and wavelength assignment algorithms for planning (offline) and operation mode (online), for transparent and translucent networks. RACTI through its collaboration with the other Diconet partners, it gained a lot of experiences that can help improving these algorithms in the future, in relation to issues like node architectures, techno-economic considerations, fault handling and other. We plan to cooperate with other universities in the context of other European projects, so as to extend further the proposed algorithms.</p>
(2)	<p>RACTI also plans to cooperate with Greek universities in the context of national projects. This way we plan to disseminate part of the knowledge we acquired through the DICONET project to national partners.</p>
(3)	<p>RACTI has already updated the material of two lessons in undergraduate and postgraduate level, with some of the results of the Diconet project. The updated material mainly focus on the proposed developed impairment aware routing and wavelength assignment algorithms and on the lessons learned during RACTI's interaction with the other partners. Also, several Master students and one PhD student base their research on the results of the Diconet project.</p>

### 3.2.8 Exploitation plan -UEssex

UEssex	WP3		WP4				WP5		WP6	WP7
	Monitoring	Q-tool	Offline IA-RWA	On Line - IA-RWA	Failure location algorithm	component placement	Interface between monitor and control plan	Network management and control protocol	FPGA concept	Techno-Economic analysis
<b>A-Patents</b>										
<b>B-Standards</b>										
<b>C- Products</b>										
<b>D- Research continuation</b>										
<i>D1-In other European funded programs</i>										
<i>(a) With Universities</i>							(1)		(3)	
<i>(b) With industry</i>							(1)		(3)	
<i>D2-In other national funded programs</i>										
<i>(a) With Universities</i>										
<i>(b) With industry</i>										
<i>D3- In other self funded programs</i>							(2)		(4)	

*Comments and description of the exploitation plan*

Note Number	Description
(1)	In DICONET, the XML based interface between devices/modules is intensively evaluated and broadly employed. This XML based information exchange mechanism can be easily ported to embedded processor or FPGA hardware for optimal performance. Another newly started EU project MAINS that we are participating needs an efficient XML based interface between GMPLS control plane and OBS network. The outcome and experience can be evaluated and transferred to the new project.
(2)	As (1), either the embedded processor or FPGA based XML parser will be further investigated and utilized in our local research and development. It's going to be an efficient, fast, versatile data exchange, system configuration method.
(3)	In WP6, we built a software/hardware acceleration platform for Q-tool, which deploys embedded processor and FPGA, as well as on-chip memory (OCM) interface for efficient data exchange between software and hardware. Apart from the data exchange, a signaling mechanism between software and hardware has been designed as well, which is based on general purpose input/output (GPIO) interrupt. Thus, this complete software/hardware co-design platform can be used for diverse applications, such as, computing acceleration, network data processing, image processing, high speed data transmission, etc. Coherently, the output and experience will be shortly deployed in EU project MAINS and STRONGEST which need 10/100 Gb/s network data processing and high speed data transmission capabilities with extensively interaction with upper layer software program.
(4)	As (3), this software/hardware co-design acceleration platform will be further investigated and utilized in our local research and development.



### 3.2.9 Exploitation plan UPC

UPC	WP3		WP4				WP5		WP6	WP7
	Monitoring	Q-tool	Offline IA-RWA	On Line - IA-RWA	Failure location algorithm	component placement	Interface between monitor and control plan	Network management and control protocol	FPGA concept	Techno-Economic analysis
<b>A-Patents</b>										
<b>B-Standards</b>										
<b>C- Products</b>										
<b>D- Research continuation</b>										
<u>D1-In other European funded programs</u>										
<i>(a) With Universities</i>							(1) (2)	(1)		
<i>(b) With industry</i>							(2)			
<u>D2-In other national funded programs</u>										
<i>(a) With Universities</i>										
<i>(b) With industry</i>										
<u>D3- In other self funded programs</u>			(3)	(3) (4)			(1)	(1)(3)(4)		

*Comments and description of the exploitation plan*

Note Number	Description
(1)	In the framework of EU funded network of excellence project BONE, UPC has actively participated in the joint activities with other involved partners and provided its contribution to joint collaboration for advancing in the development of control/management planes for optical networks.
(2)	Several protocol extensions developed for control plane architectures developed in the project are presented in standardization bodies such as IETF in collaboration with Huawei and CreateNet..
(3)	UPC has utilized the outcome of DICONET by updating the material of existing courses and by organizing short courses and research seminars for M.Sc and PhD students on specific topics.
(4)	UPC plans to devote some effort to study the feasibility of collaborating with companies interested in the exploitation of DICONET results, always taking into account the project IPR rules. As GMPLS controlled networks seem to be in a pre-commercial stage, it is foreseeable to get some co-operation agreements with companies interested in the development of the DICONET outputs.

### 3.2.10 Exploitation plan ADVA

ADVA	WP3		WP4				WP5		WP6	WP7
	Monitoring	Q-tool	Offline IA-RWA	On Line - IA-RWA	Failure location algorithm	component placement	Interface between monitor and control plan	Network management and control protocol	FPGA concept	Techno-Economic analysis
<b>A-Patents</b>										
<b>B-Standards</b>							(4)			
<b>C- Products</b>	(1)(3)	(3)	(1)(3)	(1)(3)	(3)	(3)	(3)	(3)	(3)	(3)
<b>D- Research continuation</b>										
<i>D1-In other European funded programs</i>										
<i>(a) With Universities</i>										
<i>(b) With industry</i>										
<i>D2-In other national funded programs</i>										
<i>(a) With Universities</i>										
<i>(b) With industry</i>										
<i>D3- In other self funded programs</i>	(2)	(2)								

*Comments and description of the exploitation plan*

Note Number	Description
(1)	The results of WP4 have been distributed to the software development group, working on implementing impairment awareness into the existing control plane. An ADVA internal workshop has been organized, in which the DICONET results were presented and discussions on applicability to ADVA’s product line was discussed
(2)	Based on the DICONET results, the impairments that need to be considered for impairment aware routing are evaluated and their impact is approximated.
(3)	The results / deliverables of all work packages have been made available to all technical departments on an ADVA internal website.
(4)	Several standardization proposals coming from the DICONET project have been forwarded to and examined by the control plane development group. The present state of feedback is that ADVA will currently not support any standardization in the field of control plane interfaces to support impairment awareness. As these interfaces are internal to the product and no interoperation between products of different vendors on the optical line side is required, no need for standardization is seen.



### 3.2.11 Exploitation plan DTAG

DTAG	WP3		WP4				WP5		WP6	WP7
	Monitoring	Q-tool	Offline IA-RWA	On Line - IA-RWA	Failure location algorithm	component placement	Interface between monitor and control plan	Network management and control protocol	FPGA concept	Techno-Economic analysis
<b>A-Patents</b>		(1)								
<b>B-Standards</b>										
<b>C- Products</b>										(2)
<b>D- Research continuation</b>										
<i>D1-In other European funded programs</i>										
<i>(a) With Universities</i>										
<i>(b) With industry</i>										
<i>D2-In other national funded programs</i>										
<i>(a) With Universities</i>										
<i>(b) With industry</i>										
<i>D3- In other self funded programs</i>										(2)

*Comments and description of the exploitation plan*

Note Number	Description
(1)	A patent has been filed at the European Patent Office in Munich; submitted on June, 30 <sup>th</sup> , 2009. It deals with a possible application of Optical Orthogonal Frequency Division Multiplex (OFDM) for achieving spectrally ultra-dense Terabit-per-second transmission. The scheme is based on orthogonal-band multiplexed OFDM and allows flexible breathing-like assignment of transport capacity.
(2)	Techno-economic studies on the application potentials of MD-ROADM in the national German backbone and aggregation network have been performed. In one study we investigated the concept of bigger islands of transparency and how to connect them among each other. Another evaluated the options how to evolve the existing infrastructure based on point-2-point links equipped with end terminals FOADM towards an agile packet-optical transport network. A further study considered the add/drop architecture of MD-ROADM and its impact on network operability and cost. Colored & directionless ports seem to offer the best compromise of flexibility and cost. As it even provides a clear upgrade path towards colorless ports, it is believed as the most promising architecture from the operator's perspective today. These results are considered to be of high importance for DT's future network strategy.

### 3.2.12 Exploitation plan ALF

A-LBLF	WP3		WP4				WP5		WP6	WP7
	Monitoring	Q-tool	Offline IA-RWA	On Line - IA-RWA	Failure location algorithm	component placement	Interface between monitor and control plan	Network management and control protocol	FPGA concept	Techno-Economic analysis
<b>A-Patents</b>										
<b>B-Standards</b>										
<b>C- Products</b>		(1)	(1)							
<b>D- Research continuation</b>										
<i>D1-In other European funded programs</i>	(3)	(2)	(3)	(3)		(3)				
<i>(a) With Universities</i>										
<i>(b) With industry</i>										
<i>D2-In other national funded programs</i>	(3)	(2)	(3)	(3)		(3)				
<i>(a) With Universities</i>										
<i>(b) With industry</i>										
<i>D3- In other self funded programs</i>	(5)	(5)	(4)	(5)		(5)	(5)	(5)		(4)

*Comments and description of the exploitation plan*

Note Number	Description
(1)	<p>In DICONET project it was demonstrated the interest of having a reliable quality of transmission estimator (Q-tool) when planning a transparent network. The information shared among the partners during the project about the physical transmission impairment model and experimental results enhances performance of a transparent network. For this reason Bell Labs researchers involved in DICONET discuss internally with the product line people working on the “1626LM and 1830PSS Zero-Touch Photonic” products proposed by Alcatel-Lucent to understand how to exploit DICONET results.</p>
(2)	<p>During DICONET project, Alcatel-Lucent Bell Labs France validated the quality of transmission estimator (Q-tool) using a dual-recirculating loop set-up. Such experimental tool enabled the measurement of the Q-factor of a signal propagating in a homogeneous (made either of LEAF or SMF fiber types) or in case of heterogeneous networks (links can be made either with SMF or with LEAF). Such double-loops could compute the estimation error associated to the DICONET Q-tool and so compute the reliability of physical estimation. During DICONET, the physical estimator and its reliability was computed for a 10 Gb/s transmission, ALF intends to investigate new quality of transmission estimators and their reliability for new transmission scenarii where 100 Gb/s transmission is present (we are involved in a French National funded project called 100-GRIA) and transponders working at different data-rates are implemented (elastic networks to be studied in the Celtic EO-Net project).</p>
(3)	<p>In the French National 100-GRIA and the Celtic EO-Net projects we will continue to design optical network being aware of physical impairments associated to the signal considering its data-rate and the physical characteristics of the traveled links. For this reason Alcatel-Lucent Bell Labs intends to proceed with the study of off-line and in-line IA-RWA algorithms, the evaluation of physical estimation uncertainties due to the physical impairments that are measured and also the placement of monitoring-capable devices in the network. The diversity and the numbers of optical monitoring devices will impact the transparent optical network design. Following the approach and main rules</p>

	obtained during DICONET project, we want to understand how higher and mixed data-rates networks behave.
(4)	The IA-RWA tool developed during DICONET project showed an improvement on the network resource utilization, anyway the routing computation time is too high to be used by our product line designer, for this reason we intend to work on speed-up the DICONET approach and evaluate the cost of simplified approaches.
(5)	Alcatel-Lucent is involved in the Green-Touch consortium which goal is to design a greener optical network for early 2020. Alcatel-Lucent Bell Labs will propose new dynamics networks to better fit with traffic evolution using main DICONET results about the interests of having a control plane able to up-load physical information about the optical signals transported and the state of the network.

### 3.2.13 Exploitation plan ECI

ECI	WP3		WP4				WP5		WP6	WP7
	Monitoring	Q-tool	Offline IA-RWA	On Line - IA-RWA	Failure location algorithm	component placement	Interface between monitor and control plan	Network management and control protocol	FPGA concept	Techno-Economic analysis
<b>A-Patents</b>										
<b>B-Standards</b>										
<b>C- Products</b>										
	(1)					(6)	(7)			
	(2)									
<b>D- Research continuation</b>										
<u>D1-In other European funded programs</u>										
(a) With Universities										
(b) With industry										
<u>D2-In other national funded programs</u>										
(a) With Universities	(1)	(3)	(4)	(4)	(4)	(4)				
(b) With industry	(1)	(3)						(4)		(4)
<u>D3- In other self funded programs</u>	(2)		(5)	(5)						

*Comments and description of the exploitation plan*

Note Number	Description
(1), (3)	(1) We have initiated a national funded program (called TERA SANTA) for Tera Bit Dynamic optical networks. This program will start at the beginning of the last quarter of 2010. This program is a collaboration between several local industries and universities. The DICONET outcome monitoring techniques will be extended to future monitoring in system with bit rate of 1Tb/s. The expected outcome is a monitoring module for high bit rate systems.
(2)	Some of ECI contributions to DICONET were focused on the optical monitoring issue. This issue will be extremely important mainly when we will shift to 100Gbps networks which are going to be in the near future. For this bit rate a further investigation of monitoring technique will be mandatory. This investigation will be based on the activities done in DICONET under WP3 on optical channel monitoring technologies as well as to use them for the dynamic and transparent networks. The expected outcome is a monitoring module for high bit rate systems.
(4), (5)	See (1) and (3) Tera Santa project. This project deals also with the 100G and Tera bit Dynamic networks and the outcomes of DICONET will be a basis background to develop W-SON ( Wavelength switched Optical Networks). (5) stands for 100G
6	The outcomes of component placement will be also used for ECI planning tools
(7)	The interfaces between the monitoring and the control plane studied in DICONET will be evaluated for implementation in ECI management plan.



### 3.3 Intermediate report on societal implications

Replies to the following questions will assist the European Commission to obtain statistics and indicators on societal and socio-economic issues addressed by projects. The questions are arranged in a number of key themes. As well as producing certain statistics, the replies will also help identify those projects that have shown a real engagement with wider societal issues, and thereby identify interesting approaches to these issues and best practices. The replies for individual projects will not be made public.

A General Information		
Grant Agreement Number:	216338	
Title of Project:	DICONET	
Name and Title of Coordinator:	POINT Jean-Charles, Ceo, JCP-Consult	
B Ethics		
1. Did you have ethicists or others with specific experience of ethical issues involved in the project?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
2. Please indicate whether your project involved any of the following issues (tick box) :		
<b>INFORMED CONSENT</b>		
• Did the project involve children?	-	
• Did the project involve patients or persons not able to give consent?	-	
• Did the project involve adult healthy volunteers?	-	
• Did the project involve Human Genetic Material?	-	
• Did the project involve Human biological samples?	-	
• Did the project involve Human data collection?	-	
<b>RESEARCH ON HUMAN EMBRYO/FOETUS</b>		
• Did the project involve Human Embryos?	-	
• Did the project involve Human Foetal Tissue / Cells?	-	
• Did the project involve Human Embryonic Stem Cells?	-	
<b>PRIVACY</b>		
• Did the project involve processing of genetic information or personal data (eg. health, sex, lifestyle, ethnicity, political opinion, religious or philosophical conviction)	-	
• Did the project involve tracking the location or observation of people?	-	
<b>RESEARCH ON ANIMALS</b>		
• Did the project involve research on animals?	-	
• Were those animals transgenic small laboratory animals?	-	
• Were those animals transgenic farm animals?	-	
• Were those animals cloning farm animals?	-	
• Were those animals non-human primates?	-	
<b>RESEARCH INVOLVING DEVELOPING COUNTRIES</b>		
• Use of local resources (genetic, animal, plant etc)	-	
• Benefit to local community (capacity building ie access to healthcare, education etc)	-	
<b>DUAL USE</b>		
• Research having potential military / terrorist application	-	

<b>C Workforce Statistics - JCP</b>		
<b>3 Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).</b>		
<b>Type of Position</b>	<b>Number of Women</b>	<b>Number of Men</b>
Scientific Coordinator		
Work package leader	1	1
Experienced researcher (i.e. PhD holders)		
PhD Students		
Other	1 (legal matters)	
<b>4 How many additional researchers (in companies and universities) were recruited specifically for this project?</b>		
Of which, indicate the number of men:		
Of which, indicate the number of Women:		
<b>D Gender Aspects</b>		
<b>5 Did you carry out specific Gender Equality Actions under the project?</b>	<input type="radio"/>	Yes
	<input checked="" type="radio"/>	No
<b>6 Which of the following actions did you carry out and how effective were they?</b>		
	<b>Not at effec</b>	<b>Very effective</b>
<input type="checkbox"/> Design and implement an equal opportunity policy	X	○ ○ ○ ○ ○
<input type="checkbox"/> Set targets to achieve a gender balance in the workforce	X	○ ○ ○ ○ ○
<input type="checkbox"/> Organise conferences and workshops on gender	X	○ ○ ○ ○ ○
<input type="checkbox"/> Actions to improve work-life balance	X	○ ○ ○ ○ ○
<input type="radio"/> Other: <input style="width: 200px;" type="text"/>		
<b>7 Was there a gender dimension associated with the research content – i.e. wherever people were the focus of the research as, for example, consumers, users, patients or in trials, was the issue of gender considered and addressed?</b>		
<input type="radio"/> Yes- please specify <input style="width: 150px;" type="text"/>		
<input checked="" type="radio"/> No		

<b>C Workforce Statistics - AIT</b>		
<b>3 Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).</b>		
<b>Type of Position</b>	<b>Number of Women</b>	<b>Number of Men</b>
Scientific Coordinator		1
Work package leader		1
Experienced researcher (i.e. PhD holders)		2
PhD Students	1	1
Other	1	2
<b>4 How many additional researchers (in companies and universities) were recruited specifically for this project?</b>		<b>3</b>
Of which, indicate the number of men:		2
Of which, indicate the number of Women:		1

<b>C Workforce Statistics – Create-NET</b>		
<b>3 Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).</b>		
Type of Position	Number of Women	Number of Men
Scientific Coordinator		
Work package leader		1
Experienced researcher (i.e. PhD holders)		1
PhD Students		
Other		2
<b>4 How many additional researchers (in companies and universities) were recruited specifically for this project?</b>		
Of which, indicate the number of men:		2
Of which, indicate the number of Women:		

<b>C Workforce Statistics – TPT</b>		
<b>3 Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).</b>		
<b>Type of Position</b>	<b>Number of Women</b>	<b>Number of Men</b>
Scientific Coordinator		1
Work package leader		
Experienced researcher (i.e. PhD holders)	2	1
PhD Students		
Other		
<b>4 How many additional researchers (in companies and universities) were recruited specifically for this project?</b>		<b>2</b>
Of which, indicate the number of men:		1
Of which, indicate the number of Women:		1

<b>C Workforce Statistics – Huawei</b>		
<b>3 Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).</b>		
Type of Position	Number of Women	Number of Men
Scientific Coordinator		
Work package leader		
Experienced researcher (i.e. PhD holders)		2
PhD Students		
Other		3
<b>4 How many additional researchers (in companies and universities) were recruited specifically for this project?</b>		
Of which, indicate the number of men:		2
Of which, indicate the number of Women:		

C <b>Workforce Statistics – IBBT</b>		
<b>3 Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).</b>		
Type of Position	Number of Women	Number of Men
Scientific Coordinator		1
Work package leader		1
Experienced researcher (i.e. PhD holders)	1	2
PhD Students		1
Other		1
<b>4 How many additional researchers (in companies and universities) were recruited specifically for this project?</b>		
Of which, indicate the number of men:		
Of which, indicate the number of Women:		

<b>C Workforce Statistics – CTI</b>		
<b>3 Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).</b>		
Type of Position	Number of Women	Number of Men
Scientific Coordinator		1
Work package leader		1
Experienced researcher (i.e. PhD holders)		3
PhD Students		4
Other		
<b>4 How many additional researchers (in companies and universities) were recruited specifically for this project?</b>		
Of which, indicate the number of men:		
Of which, indicate the number of Women:		

<b>C Workforce Statistics – Uessex</b>		
<b>3 Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).</b>		
<b>Type of Position</b>	<b>Number of Women</b>	<b>Number of Men</b>
Scientific Coordinator		
Work package leader		
Experienced researcher (i.e. PhD holders)	1	1
PhD Students		
Other		2
<b>4 How many additional researchers (in companies and universities) were recruited specifically for this project?</b>		<b>1</b>
Of which, indicate the number of men:		1
Of which, indicate the number of Women:		

<b>C Workforce Statistics –UPC</b>		
<b>3 Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).</b>		
Type of Position	Number of Women	Number of Men
Scientific Coordinator		
Work package leader		1
Experienced researcher (i.e. PhD holders)	1	3
PhD Students		2
Other		
<b>4 How many additional researchers (in companies and universities) were recruited specifically for this project?</b>		<b>0</b>
Of which, indicate the number of men:		
Of which, indicate the number of Women:		

<b>C Workforce Statistics - ADVA</b>		
<b>3 Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).</b>		
Type of Position	Number of Women	Number of Men
Scientific Coordinator		
Work package leader		
Experienced researcher (i.e. PhD holders)		2
PhD Students		
Other		3
<b>4 How many additional researchers (in companies and universities) were recruited specifically for this project?</b>		<b>2</b>
Of which, indicate the number of men:		2
Of which, indicate the number of Women:		

<b>C Workforce Statistics - DTAG</b>		
<b>3 Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).</b>		
Type of Position	Number of Women	Number of Men
Scientific Coordinator		1
Work package leader		
Experienced researcher (i.e. PhD holders)		1
PhD Students		
Other		
<b>4 How many additional researchers (in companies and universities) were recruited specifically for this project?</b>		<b>0</b>
Of which, indicate the number of men:		
Of which, indicate the number of Women:		

<b>C Workforce Statistics – A-LBLF</b>		
<b>3 Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).</b>		
Type of Position	Number of Women	Number of Men
Scientific Coordinator		
Work package leader		
Experienced researcher (i.e. PhD holders)	1	2
PhD Students		
Other		
<b>4 How many additional researchers (in companies and universities) were recruited specifically for this project?</b>		
Of which, indicate the number of men:		
Of which, indicate the number of Women:		

<b>C Workforce Statistics - ECI</b>		
<b>3 Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).</b>		
Type of Position	Number of Women	Number of Men
Scientific Coordinator		
Work package leader		
Experienced researcher (i.e. PhD holders)		3
PhD Students		
Other	1	2
<b>4 How many additional researchers (in companies and universities) were recruited specifically for this project?</b>		<b>0</b>
Of which, indicate the number of men:		
Of which, indicate the number of Women:		

<b>E Synergies with Science Education -</b>		
<b>8</b>	<b>Did your project involve working with students and/or school pupils (e.g. open days, participation in science festivals and events, prizes/competitions or joint projects)?</b> <input type="radio"/> Yes- please specify <input style="width: 150px; height: 20px;" type="text"/> <input checked="" type="radio"/> No	
<b>9</b>	<b>Did the project generate any science education material (e.g. kits, websites, explanatory booklets, DVD)</b> <input type="radio"/> Yes- please specify <input style="width: 150px; height: 20px;" type="text"/> <input checked="" type="radio"/> Not Yet	
<b>F Interdisciplinarity</b>		
<b>10</b>	<b>Which disciplines are involved in your project? [See drop-down menus]</b> <input checked="" type="checkbox"/> Main discipline <input type="checkbox"/> Associated discipline [Menu] <input style="width: 50px; height: 20px;" type="text"/> <input type="checkbox"/> Associated discipline [Menu]	
<b>G Engaging with Civil society and policy makers</b>		
<b>11a</b>	<b>Did your project engage with societal actors beyond the research community? (if 'No', go to Question 14)</b>	<input type="radio"/> Yes <input checked="" type="radio"/> No
<b>11b</b>	<b>If yes, did you engage with citizens (citizens' panels / juries) or organised civil society (NGOs, patients' groups etc.)?</b> <input type="radio"/> No <input type="radio"/> Yes- in determining what research should be performed <input type="radio"/> Yes - in implementing the research <input type="radio"/> Yes, in communicating /disseminating / using the results of the project	
<b>11c</b>	<b>In doing so, did your project involve actors whose role is mainly to organise the dialogue with citizens and organised civil society (e.g. professional mediator; communication company, science museums)?</b>	<input type="radio"/> Yes <input type="radio"/> No
<b>12</b>	<b>Did you engage with government / public bodies or policy makers (including international organisation)</b>  <input type="radio"/> No <input type="radio"/> Yes- in framing the research agenda <input type="radio"/> Yes - in implementing the research agenda <input type="radio"/> Yes, in communicating /disseminating / using the results of the project	
<b>13a</b>	<b>Will the project generate outputs (expertise or scientific advice) which could be used by policy makers?</b> <input type="radio"/> Yes – as a <b>primary</b> objective (please indicate areas below- multiple answers possible) <input type="radio"/> Yes – as a <b>secondary</b> objective (please indicate areas below - multiple answer possible) <input type="radio"/> No	
<b>13b</b>	<b>If Yes, in which fields?</b>	

Agriculture Audiovisual and Media Budget Competition Consumers Culture Customs Development Economic Monetary Affairs Education, Training, Youth Employment and Social Affa	Energy Enlargement Enterprise Environment External Relations External Trade Fisheries and Maritime Affa Food Safety Foreign and Security Policy Fraud Humanitarian aid	Human rights Information Society Institutional affairs Internal Market Justice, freedom and security Public Health Regional Policy Research and Innovation Space Taxation Transport	
<b>13c If Yes, at which level?</b> <input type="radio"/> Local / regional levels <input type="radio"/> National level <input type="radio"/> European level <input type="radio"/> International level			
<b>H Use and dissemination</b>			
<b>14 How many Articles were published/accepted for publication in peer-reviewed journals?</b>	20		
<b>15 How many new patent applications ('priority filings') have been made?</b> <i>("Technologically unique": multiple applications for the same invention in different jurisdictions should be counted as just one application of grant).</i>	/		
<b>16 Indicate how many of the following Intellectual Property Rights were applied for (give number in each box).</b>	Trademark		
	Registered design		
	Other		
<b>17 How many spin-off companies were created / are planned as a direct result of the project?</b>  <i>Indicate the approximate number of additional jobs in these companies</i>			
<b>18 Please indicate whether your project has a potential impact on employment, in comparison with the situation before your project:</b> <input type="checkbox"/> Increase in employment, or <input type="checkbox"/> Safeguard employment, or <input type="checkbox"/> Decrease in employment, <input checked="" type="checkbox"/> Difficult to estimate / not possible to quantify			
<input type="checkbox"/> In small & medium-sized enterprises <input type="checkbox"/> In large companies <input type="checkbox"/> None of the above / not relevant to the project			
<b>19 For your project partnership please estimate the employment effect resulting directly from your participation in Full Time Equivalent (FTE = one person working full for a year) jobs:</b>  Difficult to estimate / not possible to quantify	<i>Indicate figure:</i>  <input type="checkbox"/>		

<b>I Media and Communication to the general public</b>	
<b>20</b>	<b>As part of the project, were any of the beneficiaries professionals in communication or media relations</b> <input type="radio"/> Yes <input checked="" type="radio"/> No
<b>21</b>	<b>As part of the project, have any beneficiaries received professional media / communication training / advice to improve communication with the general public?</b> <input type="radio"/> Yes <input checked="" type="radio"/> No
<b>22</b>	<b>Which of the following have been used to communicate information about your project to the general public, or have resulted from your project?</b>
<input checked="" type="checkbox"/> Press Release	<input checked="" type="checkbox"/> Coverage in specialist press
<input type="checkbox"/> Media briefing	<input checked="" type="checkbox"/> Coverage in general (non-specialist) press
<input type="checkbox"/> TV coverage / report	<input type="checkbox"/> Coverage in national press
<input type="checkbox"/> Radio coverage / report	<input type="checkbox"/> Coverage in international press
<input checked="" type="checkbox"/> Brochures /posters / flyers	<input checked="" type="checkbox"/> Website for the general public / internet
<input type="checkbox"/> DVD /Film /Multimedia	<input checked="" type="checkbox"/> Event targeting general public (festival, conference, exhibition, science café)
<b>23</b>	<b>In which languages are the information products for the general public produced?</b>
<input type="checkbox"/> Language of the coordinator	<input checked="" type="checkbox"/> English
<input type="checkbox"/> Other language(s)	

**Question 10:** Drop down menu will include the Classification of Scientific Disciplines according to the Frascati Manual 2002 (Proposed Standard Practice for Surveys on Research and Experimental Development, OECD 2002):

#### **FIELDS OF SCIENCE AND TECHNOLOGY**

##### 1. NATURAL SCIENCES

- 1.1 Mathematics and computer sciences [mathematics and other allied fields: computer sciences and other allied subjects (software development only; hardware development should be classified in the engineering fields)]
- 1.2 Physical sciences (astronomy and space sciences, physics and other allied subjects)
- 1.3 Chemical sciences (chemistry, other allied subjects)
- 1.4 Earth and related environmental sciences (geology, geophysics, mineralogy, physical geography and other geosciences, meteorology and other atmospheric sciences including climatic research, oceanography, vulcanology, palaeoecology, other allied sciences)
- 1.5 Biological sciences (biology, botany, bacteriology, microbiology, zoology, entomology, genetics, biochemistry, biophysics, other allied sciences, excluding clinical and veterinary sciences)

##### 2. ENGINEERING AND TECHNOLOGY

- 2.1 Civil engineering (architecture engineering, building science and engineering, construction engineering, municipal and structural engineering and other allied subjects)
- 2.2 Electrical engineering, electronics [electrical engineering, electronics, communication engineering and systems, computer engineering (hardware only) and other allied subjects]
- 2.3. Other engineering sciences (such as chemical, aeronautical and space, mechanical, metallurgical and materials engineering, and their specialised subdivisions; forest products; applied sciences such as geodesy, industrial chemistry, etc.; the science and technology of food production; specialised technologies of interdisciplinary fields, e.g. systems analysis, metallurgy, mining, textile technology and other applied subjects)

### 3. MEDICAL SCIENCES

- 3.1 Basic medicine (anatomy, cytology, physiology, genetics, pharmacy, pharmacology, toxicology, immunology and immunohaematology, clinical chemistry, clinical microbiology, pathology)
- 3.2 Clinical medicine (anaesthesiology, paediatrics, obstetrics and gynaecology, internal medicine, surgery, dentistry, neurology, psychiatry, radiology, therapeutics, otorhinolaryngology, ophthalmology)
- 3.3 Health sciences (public health services, social medicine, hygiene, nursing, epidemiology)

### 4. AGRICULTURAL SCIENCES

- 4.1 Agriculture, forestry, fisheries and allied sciences (agronomy, animal husbandry, fisheries, forestry, horticulture, other allied subjects)
- 4.2 Veterinary medicine

### 5. SOCIAL SCIENCES

- 5.1 Psychology
- 5.2 Economics
- 5.3 Educational sciences (education and training and other allied subjects)
- 5.4 Other social sciences [anthropology (social and cultural) and ethnology, demography, geography (human, economic and social), town and country planning, management, law, linguistics, political sciences, sociology, organization and methods, miscellaneous social sciences and interdisciplinary, methodological and historical S1T activities relating to subjects in this group. Physical anthropology, physical geography and psychophysiology should normally be classified with the natural sciences].

### 6. HUMANITIES

- 6.1 History (history, prehistory and history, together with auxiliary historical disciplines such as archaeology, numismatics, paleography, genealogy, etc.)
- 6.2 Languages and literature (ancient and modern)
- 6.3 Other humanities [philosophy (including the history of science and technology) arts, history of art, art criticism, painting, sculpture, musicology, dramatic art excluding artistic "research" of any kind, religion, theology, other fields and subjects pertaining to the humanities, methodological, historical and

## **4 References**

- [1] D7.2Mid-term report on DICONET exploitation and dissemination plans including contributions to standards
- [2] Project Contract GA 216338 and Annex II (General Conditions)
- [3] Project Contract - Annex 1 "Description of the Work" (DoW-revised Feb 15, 2009)
- [4] Consortium Agreement (CA)
- [5] Rules for Participation (RfP) - Regulation (Ec) No 1906/2006 Of The European Parliament And Of The Council

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