CHRON

Cognitive Heterogeneous Reconfigurable Optical Network

Grant Agreement Nº 258644

D7.6 Final report on dissemination and exploitation plan

WP7 Dissemination, Exploitation and Standardization

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0.2	10/05/2013	All	All	Recollection of dissemination information
0.3	03/06/2013	David Sánchez, Patricia Fernández	UVa	Elaboration of the report
0.4	30/10/2013	All	All	New recollection of dissemination information e
1.0	07/11/2013	Juan Carlos Aguado, Noemí Merayo, Patricia Fernández	UVa	Update of the report

Annexes:

Nº	File Name	Title
I	(Included in this document)	Detailed description of press-releases
II	(Included in this document)	Detailed description of the technical publications
III	(Included in this document)	Detailed description of the contributions to conferences, workshops and symposiums
IV	(Included in this document)	Detailed description of the other dissemination activities

The CHRON project consortium groups the following organizations:

Short Name	Partner Name	Country
UVa	Universidad de Valladolid	Spain
DTU	Danmarks Tekniske Universitet	Denmark
HWDU	Huawei Technologies Duesseldorf GmbH	Germany
TP SA	Telekomunikacja Polska S.A.	Poland
AIT	Research and Education Laboratory in Information Technologies	Greece
CREATE-NET	Center for Research and Telecommunication Experimentation for Networked Communities	Italy

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Executive Summary:

This report is a continuation of the Deliverable 7.4. It describes the dissemination activities performed in CHRON during the third year of the project (Month 25 to Month 39), as well as the exploitation plan. Moreover, a set of annexes have been included to complete the information related to each dissemination activity that has been carried out throughout the aforementioned period. A short summary of the dissemination activities along the whole project is also provided.

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Tables

1 Introduction

This third report on dissemination and exploitation plan addresses several issues related to both dissemination and exploitation in the CHRON project. After this introductory section the structure of the present deliverable is as follows.

Section 2 presents an overview of the dissemination of the CHRON results by devoting several sub-sections to explain some issues regarding the dissemination strategy and the accomplished dissemination activities to date (press releases; publications of technical and specialized articles; contributions to conferences, workshops or symposiums…).

In the third place, a summary of the activities in the exploitation plan carried out during the last year is presented. The objectives of the exploitation plan were described in [1].

Then, Section 4 and Section 5 present the most relevant conclusions and the references that have supported the creation of this report, respectively. Those sections are followed by a list of acronyms and abbreviations to facilitate the reading of this deliverable.

Finally, several annexes recollect with much more detail the information of the dissemination activities presented in section 2. Apart from the table fulfilled by the partners involved there are other materials in the CHRON Intranet [2] such as papers, posters, short papers, proceedings, certificates of attendance, invitation letters, photos, programs and agendas, scanned covers of books/journals where the publication itself appears…

2 Dissemination of the CHRON results

This section presents in a brief way several issues concerning the dissemination of the CHRON results. In [3] an overview of the dissemination strategy to be followed along the project lifetime was presented to facilitate the understanding of this type of deliverables. Moreover, other previously presented aspects were the corporate identity of CHRON project, the CHRON website together with its most relevant sections and menus, and some guidelines regarding the printed media to disseminate the project results.

2.1 Dissemination strategy

With the aim of disseminating the most relevant results in CHRON, the tasks related to the work-package 7 went ahead in conjunction with exploitation and standardization strategies.

The two initially defined action lines have continued being active until the end of the project. In the first place, this report gathers the CHRON dissemination activities including, among others, both the presentation and publication of the project results in conferences and magazines. The dissemination project results of the two previous years can be found in D7.2 [3] and D7.4 [1]. Secondly, the CHRON Consortium has also worked on standardization activities to contribute to standardization bodies with project results. The result of that work is provided in deliverable D7.8 [4].

As for the management activities that together with dissemination actions constitute this strategy it is important to pay attention to both the **website** and the **intranet**. Both were explained in detail in [3] and continue allowing consortium members to exchange and share information among participants.

Another activity that contributed in spreading the CHRON results was the organization of a **workshop** to interact with other ICT projects. In particular, a workshop was hold in Amsterdam in September 2012, and it was located into the Annual European Conference and Exhibition on Optical Communication (ECOC), a leading fiber optic forum. The workshop[1] about Flexible and Cognitive Optical Networks assessed the current status of cognition as a technique supporting flexible optical networking by paying special attention to CHRON. The workshop presented latest developments to date, and also pointed out and it was discussed challenges in realizing future optical networks with dynamic resource allocation and cognitive control. More details about the workshop can be found in Deliverable D7.7 [5].

2.2 Accomplished dissemination activities

This sub-section addresses a summarised version of the information related to the accomplished dissemination activities in CHRON in the third year. *It should be noted that some contributions belong to a previous date of the reported period, but they were neither included in D7.2 [3] nor D7.4 [1] and that is the reason why they appear in the current report*.

[1] Further information in: http://www.ecoc2012.org/programme_workshops.asp#ws05

2.2.1. Press releases

Next table (Table 1) contains a list of all the press releases that have appeared throughout the third year of CHRON project. Further information about these press releases is available in the "Annex I. Detailed description of press releases."

PRESS RELEASES			
DATE OF APPEARANCE	**NEWSPAPER, MAGAZINE OR GAZETTE'S NAME**	**PARTICIPANT PARTNER**	**LANGUAGE**
3rd October 2012	Net-Tech Future Magazine (Table 5)	CHRON consortium	English
22nd October 2012	El Mundo de Castilla y León (Innovadores) (Table 6)	UVa	Spanish

Table 1. Press Releases in CHRON framework

2.2.2. Publications of technical and specialized articles

The publication of CHRON results both in technical and specialized articles is summarized below (Table 2) and further information can be found in "Annex II. Detailed description of the technical publications".

PUBLICATIONS OF TECHNICAL AND SPECIALIZED ARTICLES		
DATE OF APPEARANCE	**JOURNAL**	**PARTICIPANT PARTNER**
December 7, 2011	JOCN (Table 7)	AIT
October 12, 2012	JOCN (Table 8)	AIT
November 28, 2012	Optics Express (Table 9)	DTU, HWDU

December 10, 2012	Optics Express (Table 10)	DTU/UVa
January, 2013	JSAC (Table 11)	AIT
March 15, 2013	JLT (Table 12)	UVa, AIT
12th September 2013	Journal of Optical Communications and Networking (JOCN) (Table 13)	UVa, DTU, HWDU, TPSA, AIT, CREATE-NET
17th September 2013	Photonics Technology Letters (PTL) (Table 14)	DTU
October 2013	Optical Switching and Networking (OSN) (Table 15)	HWDU
29th October 2013	Green Networking and Communications (Table 16)	HWDU
submitted	Journal of Lightwave Technology (Table 17)	DTU, UVa, AIT, CREATE-NET, HUAWEI, TPSA

Table 2. Publications of technical and specialized articles in CHRON framework

2.2.3. Contributions to conferences, workshops and symposiums

The CHRON contributions to conferences, workshops, symposiums and other important events are listed below (Table 3) and further information is presented in "Annex III. Detailed description of the contributions to conferences, workshops and symposiums".

CONTRIBUTIONS TO DISSEMINATIVE EVENTS				
EVENT	**LOCATION**	**DATE**	**TITLE**	**PARTNER INVOLVED**
OFC / NFOEC 2012 (Table 18)	Los Angeles California USA	4th – 8th March 2012	Novel trends in performance monitoring	HWDU
14th International Conference on Transparent Optical Networks (ICTON 2012) (Table 19)	Coventry, England	2nd – 5th July 2012	A Control Plane Framework for Future Cognitive Heterogeneous Optical Networks	CREATE-NET, AIT, UVa
14th International Conference on Transparent Optical Networks (ICTON 2012) (Table 20)			Extending Impairment-Aware Control Plane Solutions toward Cognitive Optical Networks	HWDU, CREATE-NET, AIT, UVa
14th International Conference on Transparent Optical Networks (ICTON 2012) (Table 21)			Performance Comparison of Methods to Solve the Routing and Spectrum Allocation Problem	UVa
14th International Conference on Transparent Optical Networks (ICTON 2012) (Table 22)			A survey of recent developments on flexible/elastic optical networking	AIT

Future Network & Mobile Summit 2012 (Table 23)	Berlin, Germany	4th- 6th July 2012	A Cognitive Decision System for Heterogeneous Optical Networks	UVa, CREATE-NET, AIT
Future Network & Mobile Summit 2012 (Table 24)			Challenges of Cognitive Networks Standardization - CHRON	TP
Photonics in Switching 2012 (Table 25)	Ajaccio, Corsica Island, France	11th – 14th September 2012	Enabling technologies for evolving flexible/elastic optical transmission and expected benefits from their introduction in the networks	AIT
CHRON Workshop at ECOC 2012 (Table 26)	Amsterdam, The Netherlands	16th September 2012	Organization of the CHRON Workshop	DTU, AIT
38th European Conference and Exhibition on Optical Communication (ECOC 2012) (Table 27)			The EU CHRON Project: Cognitive Heterogeneous Reconfigurable Optical Network	UVa
38th European Conference and Exhibition on Optical Communication (ECOC 2012) (Table 28)			Network Performance Evaluation for Nyquist-WDM-Based Flexible Optical Networking	AIT
38th European Conference and Exhibition on Optical Communication (ECOC 2012)		19th September 2012	Experimental Demonstration of a Cognitive Quality of Transmission Estimator for Optical Communication	DTU, UVa

(Table 29)			Systems	
38th European Conference and Exhibition on Optical Communication (ECOC 2012) (Table 30)			Training-based Channel Estimation for Signal Equalization and OPM in 16-QAM Optical Transmission Systems	HWDU, DTU
38th European Conference and Exhibition on Optical Communication (ECOC 2012) (Table 31)			On the Energy Efficiency of Survivable Optical Transport Networks with Flexible-grid	HWDU
Photonics Conference (IPC), 2012 IEEE (Table 32)	Burlingame, California, USA	23rd – 27th September 2012	Frequency Domain Training-Aided Channel Estimation and Equalization in Time-Varying Optical Transmission Systems	HWDU, DTU
4th International Workshop on Reliable Networks Design and Modeling (RNDM 2012) (Table 33)	St. Petersburg, Russia	3th - 5th October 2012	Survivable and Impairment-Aware Virtual Topologies for Reconfigurable Optical Networks: a Cognitive Approach	UVa, AIT
4th International Congress on Ultra Modern Telecommunications and Control Systems and Workshops (ICMUT 2012) (Table 34)	St. Petersburg, Russia	3th - 5th October 2012	NICER: A Distributed Dynamic Shared-backup Path-Allocation Procedure for Transmission-Impaired WDM Optical Networks	CREATE-NET

SPIE OPTO 2013, Photonic West (Table 35)	San Francisco, California	5th February 2013	Cognition-Enabling Techniques in Heterogeneous and Flex-grid Optical Communication Networks	DTU
Future Networks 10th Concertation Meeting (Table 36)	Brussels, Belgium	27th – 28th February 2013	CaON Participation	UVa
DRCN2013 (Table 37)	Budapest, Hungary	4th - 7th March 2013	Quality of protection schemes with extended flexibility for improved energy efficiency in transport networks	HWDU
Optical Fiber Communication Conference 2013 (OFC 2013) (Table 38)	Anaheim, CA, USA	17th-21st March 2013	Cognitive Dynamic Optical Networks (invited)	UVa, DTU, HWDU, TP SA, AIT, CREATE-NET
Optical Fiber Communication Conference 2013 (OFC 2013) (Table 39)	Anaheim, CA, USA	17th-21st March 2013	Dynamic Cooperative Spectrum Sharing in Elastic Networks	AIT
OFC 2013 (Table 40)	Anaheim, CA, USA	17th-21st March 2013	Optical Modulation Format Recognition in Stokes Space for Digital Coherent Receivers	DTU
OFC 2013 (Table 41)	Anaheim, CA, USA	19th-21st March 2013	Interplay of Filtering and Nonlinear Transmission in Coherent Uncompensated DWDM System	HWDU

OFC 2013 (Table 42)	Anaheim, CA, USA	19th-21st March 2013	Differentiated Quality of Protection to Improve Energy Efficiency of Survivable Optical Transport Networks	HWDU
ONDM2013 (Table 43)	Brest, France	16th-19th April 2013	Experimental demonstration of a PCE for wavelength-routed optical burst-switched (WR-OBS) networks	UVa
FIA2013 (Table 44)	Dublin, Ireland	8th-10th May 2013	Cognitive Heterogeneous Reconfigurable Optical Network	UVa
15th International Conference on Transparent Optical Networks (ICTON) (Table 45)	Cartagena, Spain	23rd – 27th June 2013	On the cost efficiency of flexible optical networking compared to conventional SLR/MLR WDM networks	AIT
15th International Conference on Transparent Optical Networks (ICTON) (Table 46)			Performance Monitoring Techniques Supporting Cognitive Optical Networking	DTU
OptoElectronics and Commnications Conference (OECC) International Conference on Photonics in Switching (COIN/PS) (Table 47)	Kyote, Korea	30th June -4th July 2013	QoT prediction for core networks with uncompensated coherent transmission	AIT

Future Network & Mobile Summit 2013 workshop (Table 48)	Lisbon, Portugal	3rd-5th July 2013	Differentiated quality of protection schemes for improved energy efficiency in optical transport networks	HWDU
Future Network & Mobile Summit 2013 workshop (Table 49)	Lisbon, Portugal	3rd-5th July 2013	Cognitive Heterogeneous Reconfigurable Optical Network: A Techno-Economic Evaluation	AIT, UVa, HWDU
NOC/OC&I 2013 (Table 50)	Graz, Austria	10th July 2013	Toward a control and management system enabling cognitive optical networks	CREATE-NET
Optics & Photonics Congress, Photonic Networks and Devices (NETWORKS) (Table 51)	Río Grande, Puerto Rico	14th -17th July 2013	The rise of flexible optical networking	AIT
RNDM 2013 (Table 52)	Almaty, Kazakhstan	10th -12th September 2013	Virtual Topology Design and Reconfiguration using Cognition: Performance Evaluation in Case of Failure	UVa, AIT
SoftCom2013 (Table 53)	Split, Croatia	18th – 20th Sept. 2013	Energy-efficient and Low Blocking Differentiated Quality of Protection Scheme for Dynamic Elastic Optical Networks	HWDU
ECOC 2013 (Table 54)	London, UK	22nd-26th, Sept. 2013	Influence of Embodied Energy in the Energy Efficiency of Optical Transport Networks	HWDU, DTU

ECOC 2013 (Table 55)	London, UK	22nd-26th Sept. 2013	Energy- and Cost-Efficient Protection in Core Networks by a Differentiated Quality of Protection Scheme	HWDU
ECOC 2013 (Table 56)	London, UK	24th September 2013	Techno-Economic Advantages of Cognitive Virtual Topology Design	UVa, AIT
ECOC 2013 (Table 57)	London, UK	25th September 2013	Minimization of the Impact of the TED Inaccuracy Problem in PCE-Based Networks by Means of Cognition	UVa, CREATE-NET
OFC 2014 (submitted) (Table 58)	San Francisco, USA	9th- 14th March 2014	Advanced Modulation Formats in Cognitive Optical Networks: EU project CHRON Demonstration	DTU, AIT, CREATE-NET, UVa
OFC 2014 (submitted) (Table 59)	San Francisco, USA	9th-14th March 2014	Experimental Evaluation of Virtual Topology Design and Reconfiguration in Optical Networks by means of Cognition	CREATE-NET, UVa
OFC 2014 (submitted) (Table 60)	San Francisco, USA	9TH- 14th March 2014	Experimental Demonstration of a Cognitive Optical Network for Reduction of Restoration Time	AIT, CREATE-NET, UVa, DTU, Huawei, TPSA
OFC 2014 (submitted) (Table 61)	San Francisco, USA	9TH- 14th March 2014	Proactive Restoration of Slow-Failures in Optical Networks base don a Cognitive Approach	CREATE-NET, DTU

OFC 2014 (submitted) (Table 62)	San Francisco, USA	9TH- 14th March 2014	Energy Saving Through Traffic Profiling and Prediction in Self-Optimizing Optical Networks	CREATE-NET
ICC 2014 (submitted) (Table 63)	Sidney, Australia	10th- 14th June 2014	Optimization of the Use of Resources in a Cognitive Heterogeneous Optical Network	UVa, AIT

Table 3 Contributions to conferences, workshops and symposiums.

2.2.4. Other dissemination activities

Next table (Table 4) contains a list of other dissemination activities that have been undertaken during the last year of CHRON project. Further information about these activities is available in the "Annex IV. Detailed description of the other dissemination activities"

OTHER DISSEMINATION ACTIVITIES		
DATE OF APPEARANCE	**TYPE OF ACTIVITY**	**PARTICIPANT PARTNER**
31th July 2012	Master Thesis (Table 64)	DTU
July 2012	Research Question for PhD. Thesis (Table 65)	UVa
14th September 2012	Master Thesis (Table 66)	UVa
3rd December 2012	Globecom 2012 Workshop (Table 67)	HWDU
10th September 2013	Master Thesis (Table 68)	DTU
September 2013	Korea-EU planning workshop on "Future Internet" (Table 69)	AIT
September 2013	ECOC'2013 Workshop (Table 70)	AIT
15th October 2013	Master Thesis (Table 71)	CREATE-NET

Table 4. Other dissemination activities in CHRON framework

3 Exploitation Plan

3.1 Exploitation strategy

Apart from dissemination issues, Work package 7 was in charge of undertaking exploitation activities and its aim was to contribute to standardization bodies with the project results. Information related to the exploitation strategy was presented in [1].

3.2 Accomplished exploitation activities

Partners have accomplished the activities described in [1]. Particularly, most interesting project outcomes have being published and updated regularly in the website of the CHRON project (www.ict-chron.eu), making them available worldwide, for telecom operators and other key stakeholders.

Partners have also make an intense effort in developing a business plan, which result can be found in [6].

Industrial partners, HWDU and TP SA, have continued to play an important role spreading the CHRON results inside the industry, and they have made contributions to several standards introducing topics related to CHRON ideas. Moreover, this year CREATE-NET and UVa partners have made another contribution to standardization. All the contributions to international standards can be found in [4].

Apart from contributions to international journals and conferences, the consortium has also spread the CHRON ideas in several workshops, that can be found in sections 2.2 and 4.

Finally, UVa, DTU and CREATE-NET have taken advantage of CHRON results with educational purposes. Four Master Thesis have been presented in the last year, and PhD Thesis are expected to be presented during the first semester of 2014.

4 Conclusions

This third report on dissemination and exploitation plan has presented the final results on dissemination and exploitation in the CHRON project.

Firstly, the activity of dissemination has had an increasing impact. As a summary of the effort made by the CHRON consortium in order to publish the results of the project, throughout the project lifetime ***no less than seventeen press releases*** have been published in regional, national and international media.

The consortium has also presented the main ideas of the CHRON project in several workshops. Specifically, ***one workshop was organized*** in order to explain in detail the innovative ideas of the project and three more workshops were also organized by the partners including some of the main ideas of the CHRON project. Moreover, we have ***participated in other eight workshops***, where we focused and explain a particular issue of the project.

As for technical contributions in ***conferences***, the partners have presented the number of ***72 contributions***, all in the most important international conferences in Europe and North America. Particularly, five contributions were presented in the Future Networks and Mobile Summit, 10 in the European Conference on Optical Communications (ECOC), 14 in Optical Fiber Communication Conference (OFC), and 9 in the International Conference in Transparent Optical Networks (ICTON).

The results of the projects have been also presented in the most important technical Journals. The partners have presented ***fifteen papers***, three in Journal of Lightwave Technology, five in Optic Express, two in Journal of Optical Communications and Networking and one in Computer Networks, Lecture Notes in Computer Science, IEEE Journal on Selected Areas in Communications, Photonics Technology Letters and Optical Switching and Networking.

Finally, the dissemination results can improve after the official finalization of the project, as it has been sent five contributions to the next edition of OFC, another to the International Conference in Communications (ICC) and a paper to the Journal of Lightwave Technology

Concerning the exploitation activities, the described objectives presented in [2] have been achieved and a detailed explanation of them and further plans can be found in [4] and [6].

5 References

[1] Deliverable 7.4, “Second Report on Dissemination and Exploitation Plan”, FP7/2007-2013, Ref. 258644, December 2012.

[2] CHRON Website, www.ict-chron.eu, FP7/2007-2013, Ref. 258644, Last update in November 2013.

[3] Deliverable 7.2, “First Report on Dissemination and Exploitation Plan”, FP7/2007-2013, Ref. 258644, June 2011.

[4] Deliverable 7.8, “Report on standardization activities”, FP7/2007-2013, Ref. 258644, November 2013.

[5] Deliverable 7.7, “Report on the Workshop”, FP7/2007-2013, Ref. 258644, June 2013.

[6] Deliverable 7.5, “Final Business Model Plan”, FP7/2007-2013, Ref. 258644, November 2013

6 List of Acronyms and Abbreviations

CaON	Converged and Optical Networks
CAZAC	Constant Amplitude Zero Auto-Correlation
CBR	Case Based Reasoning
CCW	Computer Communications Workshop
CD	Chromatic Dispersion
CogSIMA	Conference on cognitive methods in situation awareness and decision support
DGD	Differential Group Delay
DP	Dual Polarization Quadrature Phase Shift Keying
ECOC	European Conference Optical Communications
FI	Future Internet
IAC	Industrial Advisory Committee
ICC	IEEE International Conference
ICT	Information Communication Technology
ICTON	International Conference on Transparent Optical Networks
IEEE	Institute of Electrical and Electronics Engineers
ITU	International Telecommunication Union
LNCS	Lecture Notes in Computer Science
MLR	Mixed Line Rate
NFOEC	National Fiber Optic Engineers Conference
NOC	Networks and Optical Communications

NoF	Network of the Future
OFC	Optical Fiber Communication
OFDM	Orthogonal Frequency Division Multiplexing
ONDM	Optical Networking Design and Modelling
OSA	Optical Society of America
OSNR	Optical Signal to Noise Ratio
PDL	Polarization Dependent Loss
PDM	Polarization Mode Dispersion
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
RAS	Radio Access and Spectrum
SLR	Single Line Rate
SOP	State Of Polarization
SPPCom	Signal Processing in Photonics Communications
WDM	Wavelength Division Multiplexing

Annex I. Detailed description of press releases

This annex builds on additional information for the sub-section 2.2.1.

TITLE OF THE JOURNAL	Net-Tech Future Magazine
EDITOR	The European Commission's CONNECT-Communication Networks, Content and Technology Directorate-General Unit E1- Network Technologies ISBN 978-92-79-25364-5
DATE OF APPEARANCE	3rd October 2012
TITLE OF THE CONTRIBUTION	Teaching Telecoms Networks To Run the Future Internet Better
AUTHORS AND PARTNER INVOLVED	CHRON consortium
ABSTRACT	As the internet continues to grow exponentially and increase in diversity, European researchers are developing promising new cognitive systems that will enable telecommunications networks to "learn" how to run the network more efficiently.
LANGUAGE	English
ADDITIONAL COMMENTS	http://cordis.europa.eu/fp7/ict/future-networks/net-tech-future/files/assets/downloads/inf_12_003_nettechfuture_magazine_en.pdf

Table 5 Net-Tech Future Magazine

TITLE OF THE JOURNAL	El Mundo de Castilla y León (Innovadores)
EDITOR	El Mundo
DATE OF APPEARANCE	22nd October 2012
TITLE OF THE CONTRIBUTION	Cerebro artificial de comunicaciones ópticas
AUTHORS AND PARTNER INVOLVED	UVa
ABSTRACT	La UVa lidera un proyecto basado en la inteligencia artificial para gestionar los recursos de las redes y solucionar problemas de manera automática, con el objetivo de ser más eficientes y ahorrar costes.
LANGUAGE	Spanish
ADDITIONAL COMMENTS	http://www.psc.uva.es/pdf_dossier/2012/10/0011EIS7.pdf

Table 6 El Mundo de Castilla y León (Innovadores)

Annex II. Detailed description of the technical publications[2]

This annex builds on additional information for the sub-section 2.2.2.

TITLE OF THE JOURNAL	Journal of Optical Communications and Networking (JOCN)
EDITOR	© 2011 OSA
DATE OF APPEARANCE	7th December 2011
TITLE OF THE CONTRIBUTION	Optimized Monitor Placement for Accurate QoT Assessment in Core Optical Networks
AUTHORS AND PARTNER INVOLVED	Marianna Angelou[1], Yvan Pointurier, Davide Careglio, Salvatore Spadaro, Ioannis Tomkos[1] [1]AIT
ABSTRACT	Network operators deploy optical monitors to ensure uninterrupted network operation and high quality of service. To achieve this they seek efficient design solutions that also maximize the benefit of their investments. In this work we present a monitoring technique that utilizes *partial* physical layer information generated by only a small set of monitors deployed in a mesh optical network to assess the quality of transmission (QoT) of all the established connections. The proposed method focuses on the *placement* of the monitors and on the minimization of the required monitoring equipment. We develop a heuristic that takes advantage of the attribute of certain end-to-end impairments that accumulate *additively* along the established lightpaths in order to find the optimum locations of a reduced number of available monitors. When monitoring a subset of the established lightpaths, it is possible to estimate the monitored QoT-related metric for all lightpaths leveraging the correlation between the connections sharing common links. The proposed algorithm efficiently selects the monitor locations that maximize the estimation accuracy. Extensive simulation studies show that the heuristic provides solutions close to the optimum and demonstrate that

[2] Attachments for this and the following annexes are in the CHRON Intranet, in the section "Shared documents".

	only a fraction of all the available monitor locations (1/4 or 1/3) need to be equipped, leading to significant cost savings. The monitor placement solutions are evaluated for core optical networks of different scales in the presence of static and incremental traffic.
LANGUAGE	English
ADDITIONAL COMMENTS	http://dx.doi.org/10.1364/JOCN.4.000015

Table 7 JOCN

TITLE OF THE JOURNAL	Journal of Optical Communications and Networking (JOCN)
EDITOR	© 2012 OSA
DATE OF APPEARANCE	12th October 2012
TITLE OF THE CONTRIBUTION	Quantifying Spectrum, Cost, and Energy Efficiency in Fixed-Grid and Flex-Grid Networks [Invited]
AUTHORS AND PARTNER INVOLVED	E. Palkopoulou[1], M. Angelou[1], D. Klonidis[1], K. Christodoulopoulos[1], A. Klekamp[1], F. Buchali[1], E. Varvarigos[1], and I. Tomkos[1] [1]AIT
ABSTRACT	Single and multi-carrier networks offering channel rates up to 400 Gb/s are evaluated under realistic reach parameters. It is found that efficient spectrum utilization and fine bit-rate granularity are essential to achieve cost and energy efficiency. Additionally, the break-even cost of flexible orthogonal frequency division multiplexing transponders is examined under different settings. The break-even cost of a flexible transponder corresponds to the cost value for which the total cost of the network is equal to that of the related single-line-rate network. The impact of the traffic load, the additional cost required for flex-grid optical cross connects, the cost of spectrum, as well as the cost of fixed-grid transponders is examined.
LANGUAGE	English
ADDITIONAL COMMENTS	http://dx.doi.org/10.1364/JOCN.4.000B42

Table 8 JOCN (II)

TITLE OF THE JOURNAL	Optics Express
EDITOR	Dimitra Simeonidou
DATE OF APPEARANCE	28th November 2012
TITLE OF THE CONTRIBUTION	Nonlinear impairment compensation using expectation maximization for dispersion managed and unmanaged PDM 16-QAM transmission
AUTHORS AND PARTNER INVOLVED	Darko Zibar[1], Ole Winther, Niccolo Franceschi[1], Robert Borkowski[1], Antonio Caballero[1], Valeria Arlunno[1], Mikkel N. Schmidt, Neil Guerrero Gonzales[2], Bangning Mao, Yabin Ye[2], Knud J. Larsen, and Idelfonso Tafur Monroy[1] [1]DTU, [2]HWDU
ABSTRACT	In this paper, we show numerically and experimentally that expectation maximization (EM) algorithm is a powerful tool in combating system impairments such as fibre nonlinearities, inphase and quadrature (I/Q) modulator imperfections and laser linewidth. The EM algorithm is an iterative algorithm that can be used to compensate for the impairments which have an imprint on a signal constellation, i.e. rotation and distortion of the constellation points. The EM is especially effective for combating non-linear phase noise (NLPN). It is because NLPN severely distorts the signal constellation and this can be tracked by the EM. The gain in the nonlinear system tolerance for the system under consideration is shown to be dependent on the transmission scenario. We show experimentally that for a dispersion managed polarization multiplexed 16-QAM system at 14 Gbaud a gain in the nonlinear system tolerance of up to 3 dB can be obtained. For, a dispersion unmanaged system this gain reduces to 0.5 dB.
LANGUAGE	English
ADDITIONAL COMMENTS	http://dx.doi.org/10.1364/OE.20.00B181

Table 9 Optics Express

TITLE OF THE JOURNAL	Optics Express
EDITOR	C. Martijn de Sterke
DATE OF APPEARANCE	10th December 2012
TITLE OF THE CONTRIBUTION	Experimental demonstration of a cognitive quality of transmission estimator for optical communication systems
AUTHORS AND PARTNER INVOLVED	Antonio Caballero[1], Juan Carlos Aguado[2], Robert Borkowski[1], Silvia Saldaña1, Tamara Jiménez[2], Ignacio de Miguel[2], Valeria Arlunno[1], Ramón J. Durán[2], Darko Zibar[1], Jesper B. Jensen[1], Rubén M. Lorenzo[2], Evaristo J. Abril[2], and Idelfonso Tafur Monroy[1] [1]DTU, [2]UVa
ABSTRACT	The impact of physical layer impairments in optical network design and operation has received significant attention in the last years, thereby requiring estimation techniques to predict the quality of transmission (QoT) of optical connections before being established. In this paper, we report on the experimental demonstration of a case-based reasoning (CBR) technique to predict whether optical channels fulfill QoT requirements, thus supporting impairment-aware networking. The validation of the cognitive QoT estimator is performed in a WDM 80 Gb/s PDM-QPSK testbed, and we demonstrate that even with a very small and not optimized underlying knowledge base, it achieves between 79% and 98.7% successful classifications based on the error vector magnitude (EVM) parameter, and approximately 100% when the classification is based on the optical signal to noise ratio (OSNR).
LANGUAGE	English
ADDITIONAL COMMENTS	http://www.opticsinfobase.org/oe/abstract.cfm?URI=oe-20-26-B64

Table 10 Optics Express

TITLE OF THE JOURNAL	Journal on Selected Areas in Communications
EDITOR	© 2013 IEEE
DATE OF APPEARANCE	January 2013
TITLE OF THE CONTRIBUTION	Time-Varying Spectrum Allocation Policies and Blocking Analysis in Flexible Optical Networks
AUTHORS AND PARTNER INVOLVED	K. Christodoulopoulos[1], I. Tomkos[1], M. Varvarigos[1] [1]AIT
ABSTRACT	We consider the problem of serving traffic in a spectrum-flexible optical network, where the spectrum allocated to an end-to-end connection can change so as to adapt to the time-varying required transmission rate. In the proposed framework, each connection is assigned a route and is allocated a reference frequency over that route, using an appropriate Routing and Spectrum Allocation (RSA) algorithm, but the spectrum it utilizes around the reference frequency is allowed to expand and contract to match source rate fluctuations. We propose and analyze three spectrum expansion/contraction (SEC) policies for modifying the spectrum allocated to each connection. The first policy, named the Constant Spectrum Allocation (CSA) policy, allocates a number of spectrum slots for exclusive use by each connection. We also present two policies that enable the dynamic sharing of spectrum slots among connections, named the Dynamic High Expansion-Low Contraction (DHL) and the Dynamic Alternate Direction (DAD) policy. We give exact formulas for calculating the blocking probability for a connection and for the whole network under the CSA policy and provide corresponding approximate analyses under the DHL and DAD policies. We also present a simple iterative RSA algorithm that uses the developed blocking models so as to minimize the average blocking of the network.
LANGUAGE	English
ADDITIONAL COMMENTS	10.1109/JSAC.2013.130103

Table 11 JSAC

TITLE OF THE JOURNAL	Journal of Lightwave Technology (JLT)
EDITOR	© 2013 IEEE
DATE OF APPEARANCE	15th March 2013
TITLE OF THE CONTRIBUTION	A Cognitive Quality of Transmission Estimator for Core Optical Networks
AUTHORS AND PARTNER INVOLVED	Jiménez, T. [1]; Aguado, J.C. [1]; de Miguel, I. [1]; Duran, R.J. [1]; Angelou, M. [2]; Merayo, N. [1]; Fernandez, P. [1]; Lorenzo, R.M. [1]; Tomkos, I. [2]; Abril, E.J. [1] [1]UVa, [2]AIT
ABSTRACT	We propose a cognitive Quality of Transmission (QoT) estimator for classifying lightpaths into high or low quality categories in impairment-aware wavelength-routed optical networks. The technique is based on Case-Based Reasoning (CBR), an artificial intelligence technique which solves new problems by exploiting previous experiences, which are stored on a knowledge base. We also show that by including learning and forgetting techniques, the underlying knowledge base can be optimized, thus leading to a significant reduction on the computing time for on-line operation. The performance of the cognitive estimator is evaluated in a long haul and in an ultra-long haul network, and we demonstrate that it achieves more than 98% successful classifications, and that it is up to four orders of magnitude faster when compared with a non-cognitive QoT estimator, the Q-Tool.
LANGUAGE	English
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6420853

Table 12 JLT

TITLE OF THE JOURNAL	Journal of Optical Communications and Networking (JOCN)
EDITOR	© 2013 Optical Society of America
DATE OF APPEARANCE	12th September 2013
TITLE OF THE CONTRIBUTION	Cognitive Dynamic Optical Networks [Invited]
AUTHORS AND PARTNER INVOLVED	Ignacio de Miguel[1], Ramón J. Durán[1], Tamara Jiménez[1], Natalia Fernández[1], Juan Carlos Aguado[1], Rubén M. Lorenzo[1], Antonio Caballero[2], Idelfonso Tafur Monroy[2], Yabin Ye[3], Andrzej Tymecki[4], Ioannis Tomkos[5], Marianna Angelou[5], Dimitrios Klonidis[5], Antonio Francescon[6], Domenico Siracusa[6], and Elio Salvadori[6] [1]UVa, [2]DTU, [3]HWDU, [4]TP SA, [5]AIT, [6]CREATE-NET
ABSTRACT	The use of cognition is a promising element for the control of heterogeneous optical networks. Not only are cognitive networks able to sense current network conditions and act according to them, but they also take into account the knowledge acquired through past experiences; that is, they include learning with the aim of improving performance. In this paper, we review the fundamentals of cognitive networks and focus on their application to the optical networking area. In particular, a number of cognitive network architectures proposed so far, as well as their associated supporting technologies, are reviewed. Moreover, several applications, mainly developed in the framework of the EU FP7 Cognitive Heterogeneous Reconfigurable Optical Network (CHRON) project, are also described.
LANGUAGE	English
ADDITIONAL COMMENTS	http://dx.doi.org/10.1364/JOCN.5.00A107

Table 13 JOCN

TITLE OF THE JOURNAL	Photonics Technology Letters (PTL)
EDITOR	© 2013 IEEE
DATE OF APPEARANCE	17th September 2013
TITLE OF THE CONTRIBUTION	Stokes space-based optical modulation format recognition for digital coherent receivers
AUTHORS AND PARTNER INVOLVED	Robert Borkowski[1], Darko Zibar[1], Antonio Caballero[1], Valeria Arlunno[1], and Idelfonso Tafur Monroy[1] [1]DTU
ABSTRACT	We present a technique for modulation format recognition (MFR) for heterogeneous reconfigurable optical networks. The method is based on Stokes space signal representation and uses variational Bayesian expectation maximization machine learning algorithm. Differentiation between diverse common coherent modulation formats is successfully demonstrated numerically and experimentally. The proposed method does not require training nor constellation diagram to operate, is insensitive to polarization mixing or frequency offset and can be implemented in any receiver capable of measuring Stokes parameters.
LANGUAGE	English
ADDITIONAL COMMENTS	10.1109/LPT.2013.2282303

Table 14 PTL

TITLE OF THE JOURNAL	Optical Switching and Networking
EDITOR	G.N. Rouskas, A. Jukan
DATE OF APPEARANCE	October 2013
TITLE OF THE CONTRIBUTION	Protection in Optical Transport Networks with fixed and flexible grid: Cost and Energy Efficiency Evaluation Optical Switching and Networking
AUTHORS AND PARTNER INVOLVED	Jorge López Vizcaíno[1], Yabin Ye[1], Víctor López, Felipe Jiménez, Francesco Musumeci, Massimo Tornatore, Achille Pattavina, and Peter M. Krummrich [1]HWDU
ABSTRACT	The ever-increasing Internet traffic demand introduces new challenges for telecommunications carriers. Telecom networks will have to be upgraded to cope with the new capacity requirements. However, deploying enough capacity is not the only requirement for network operators. The impact of new technologies in terms of capital investment and energy consumption becomes a key issue. There is a special interest in investigating new mechanisms and technologies to improve the energy efficiency of future networks, while maintaining the high reliability and service availability of current optical transport networks. This article evaluates the energy- and cost-efficiency of an innovative flexible-grid orthogonal-frequency-division-multiplexing (OFDM) -based network and compares them with those for conventional wavelength-division-multiplexing (WDM) networks. Due to the importance of resilience in optical transport networks, the study considers and evaluates different protection schemes. The results demonstrate the potential energy efficiency improvements that can be achieved by an elastic OFDM-based technology, especially when a shared protection scheme is adopted, and give an insight into the potential cost benefits that such a novel technology can offer to telecommunication carriers.
LANGUAGE	English
ADDITIONAL COMMENTS	http://www.sciencedirect.com/science/article/pii/S1573427713000568

Table 15 OSN

TITLE OF THE BOOK	Green Networking and Communications: ICT for sustainability
EDITOR	Shafiullah Khan; Jaime Lloret Mauri
DATE OF APPEARANCE	29th October 2013
TITLE OF THE CONTRIBUTION (BOOK CHAPTER)	Energy Efficiency Improvement with the Innovative Flexible-Grid Optical Transport Network
AUTHORS AND PARTNER INVOLVED	J. López Vizcaíno[1], Y. Ye[1], V. López, F. Jiménez, R. Duque, I. Tafur Monroy[2], and P.M. Krummrich [1]HWDU [2]DTU
ABSTRACT	Although the information and communication technology (ICT) industry accounted for only 2 percent of global greenhouse gas emissions in 2007, the explosive increase in data traffic brought about by a rapidly growing user base of more than a billion wireless subscribers is expected to nearly double that number by 2020. It is clear that now is the time to rethink how we design and build our networks. **Green Networking and Communications: ICT for Sustainability** brings together leading academic and industrial researchers from around the world to discuss emerging developments in energy-efficient networking and communications. It covers the spectrum of research subjects, including methodologies and architectures for energy efficiency, energy-efficient protocols and networks, energy management, smart grid communications, and communication technologies for green solutions.
LANGUAGE	English
ADDITIONAL COMMENTS	http://www.crcpress.com/product/isbn/9781466568747

Table 16 Green Networking and Communications

TITLE OF THE JOURNAL	Journal of Lightwave Technology
EDITOR	IEEE
DATE OF APPEARANCE	(submitted)
TITLE OF THE CONTRIBUTION	Cognitive, Heterogeneous and Reconfigurable Optical Networks: the CHRON Project
AUTHORS AND PARTNER INVOLVED	Antonio Caballero[1], Robert Borkowski[1], Ignacio de Miguel[2], Ramón J. Durán[2], Juan Carlos Aguado[2], Natalia Fernández[2], Tamara Jiménez[2], Ignacio Rodríguez[2], David Sánchez[2], Rubén M. Lorenzo[2], Dimitrios Klonidis[3], Eleni Palkopoulou[3], Nikolaos P. Diamantopoulos[3], Ioannis Tomkos[3], Domenico Siracusa[4], Antonio Francescon[4], Elio Salvadori[4], Yabin Ye[5], Jorge López Vizcaíno[5], Fabio Pittalà[5], Andrzej Tymecki[6] and Idelfonso Tafur Monroy[1] [1] DTU, [2] UVa, [3] AIT, [4] CREATE-NET, [5] HWDU, [6] TP SA
ABSTRACT	High degree of heterogeneity of future optical networks, stemming from provisioning of services with different quality-of-transmission requirements, and transmission links employing mixed modulation formats or switching techniques, will pose a challenge for the control and management of the network. The incorporation of cognitive techniques can help to optimize a network by employing mechanisms that can observe, act, learn and improve network performance, taking into account end-to-end goals. The EU project CHRON: Cognitive Heterogeneous Reconfigurable Optical Network proposes a strategy to efficiently control the network by implementing cognition. In this paper we present different techniques developed throughout the course of the project to apply cognition in future optical networks.
LANGUAGE	English
ADDITIONAL COMMENTS	Under revision

Table 17 JLT

Annex III. Detailed description of the contributions to conferences, workshops and symposiums

This annex builds on additional information for the sub-section 2.2.3.

TITLE OF THE EVENT	OFC/NFOEC 2012
LOCATION	Los Angeles, California, USA
DATE	4th – 8th March 2012
TITLE OF THE CONTRIBUTION	Novel trends in performance monitoring
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Paper
AUTHORS AND PARTNER INVOLVED	F.N. Hauske, P. J. Stassar [1]HWDU
ABSTRACT	We give an overview of parameter and performance monitoring based on traditional all-optical techniques and emerging methods enabled by transponders with digital equalization. In particular, challenges for OPM in coherent detection systems are discussed.
LANGUAGE	English
PUBLICATION	OSA
ADDITIONAL COMMENTS	http://www.opticsinfobase.org/abstract.cfm?URI=OFC-2012-OM2C.4

Table 18 OFC/NFOEC 2012

TITLE OF THE EVENT	14th International Conference on Transparent Optical Networks (ICTON 2012)
LOCATION	Coventry, England
DATE	2nd – 5th July 2012
TITLE OF THE CONTRIBUTION	A Control Plane Framework for Future Cognitive Heterogeneous Optical Networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	D. Siracusa[1], E. Salvadori[1], A. Francescon[1], A. Zanardi1, M. Angelou[2], D. Klonidis[2], I. Tomkos[2], D. Sánchez[3], R. J. Durán[3], I. de Miguel[3] [1] CREATE-NET, [2] AIT, [3] UVa
ABSTRACT	Future optical networks are expected to provide an efficient infrastructure able to deliver a growing number of services, which have to meet various requirements in terms of quality of service. To achieve this objective the physical network is going through an evolution aimed at increasing its flexibility in terms of spectrum utilization and its level of heterogeneity in terms of supported services and technologies. In this context, cognitive optical networks represent a viable solution to fill the gap between the intelligence required by the future networks and the current optical technology. This paper proposes a control plane framework developed to coordinate the interactions among the elements of the future cognitive optical networks. The building blocks of the framework and the involved protocols are presented. Moreover, this paper provides an insight of the control plane issues related to the introduction of the flexible optical technology.
LANGUAGE	English
PUBLICATION	Proceedings of the conference /IEEE
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6253766

Table 19 ICTON 2012

TITLE OF THE EVENT	14th International Conference on Transparent Optical Networks (ICTON 2012)
LOCATION	Coventry, England
DATE	2nd – 5th July 2012
TITLE OF THE CONTRIBUTION	Extending Impairment-Aware Control Plane Solutions toward Cognitive Optical Networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	Yabin Ye[1], Antonio Francescon[2], Elio Salvadori[2], Marianna Angelou[3], Ioannis Tomkos[3], Ignacio de Miguel[4], Ramon J. Duran[4], Juan Carlos Aguado[4] [1] HWDU, [2] CREATE-NET, [3] AIT, [4] UVa
ABSTRACT	The current GMPLS control plane suffers from a lack of physical layer details, which is essential to accurately evaluate the effect of physical layer impairments (PLIs) and decide the feasibility of a lightpath. The European Union (EU) funded DICONET project extended the GMPLS protocols to carry PLI information by proposing two control plane architectures: distributed and centralized. The architectures for these two approaches have been defined, modules have been developed, and their performance has been evaluated based on emulation for various metrics. Moreover, suggestions on protocol extensions have been submitted to IETF CCAMP. On the other hand, the network evolves to be more heterogeneous in terms of not only types of services and traffic demands but also physical layers. These new challenges addressed by the EU funded project CHRON will need new architectures, the core of which is a cognitive decision system.
LANGUAGE	English
PUBLICATION	Proceedings of the conference /IEEE
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6254390

Table 20 ICTON 2012 (II)

TITLE OF THE EVENT	14th International Conference on Transparent Optical Networks (ICTON 2012)
LOCATION	Coventry, England
DATE	2nd – 5th July 2012
TITLE OF THE CONTRIBUTION	Performance Comparison of Methods to Solve the Routing and Spectrum Allocation Problem
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	R.J. Durán[1], I. Rodríguez[1], N. Fernández[1], I. de Miguel[1], N. Merayo[1], P. Fernández[1], J.C. Aguado[1], T. Jiménez[1], R. M. Lorenzo[1], E. J. Abril[1] [1]UVa
ABSTRACT	Future optical networks may increase their efficiency and flexibility by the utilization of Orthogonal Frequency Division Multiplexing (OFDM). When such a technique is employed, the spectrum assigned to a lightpath can be tailored to suit its requirements. Thus, when addressing the establishment of optical connections (lightpaths) in flexible optical networks, rather than solving the well-known Routing and Wavelength Assignment (RWA) problem, the Routing and Spectrum Assignment (RSA) problem should be solved. In this paper, we propose and compare a number of techniques to solve the RSA problem.
LANGUAGE	English
PUBLICATION	IEEE
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6254419

Table 21 ICTON 2012 (III)

TITLE OF THE EVENT	14th International Conference on Transparent Optical Networks (ICTON)
LOCATION	Coventry, England
DATE	2nd – 5th July 2012
TITLE OF THE CONTRIBUTION	A survey of recent developments on Flexible/Elastic Optical Networking
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Invited Paper, Presentation
AUTHORS AND PARTNER INVOLVED	I. Tomkos[1], E. Palkopoulou[1], M. Angelou[1] [1]AIT
ABSTRACT	There is a growing awareness that the utilized bandwidth of deployed optical fiber is rapidly approaching its maximum limit. Given the possibility for such capacity crunch, the research community has focused on seeking solutions that make the most out of the scarce network resources (such as the fiber bandwidth) and allow accommodating the ever-increasing traffic demands. In such context, new spectrum efficient optical networking techniques have been introduced as a way to offer efficient utilization of the available optical resources. "Flexible", "elastic", "tunable", "gridless" or "adaptive" are few examples of the terms used in literature to describe solutions that migrate from the fixed WDM single line rate systems to systems that provide support for the most efficient bandwidth utilization. In this paper, we review the recent developments on the research topic of flexible/elastic networking and we highlight the future research challenges.
LANGUAGE	English
PUBLICATION	IEEE
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6254409

Table 22 ICTON 2012 (IV)

TITLE OF THE EVENT	Future Network & Mobile Summit 2012
LOCATION	Berlin, Germany
DATE	4th – 6th July 2012
TITLE OF THE CONTRIBUTION	A Cognitive Decision System for Heterogeneous Reconfigurable Optical Networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	Ramón J. Durán[1], Ignacio de Miguel[1], David Sánchez[1], Natalia Fernández[1], Tamara Jiménez[1], Juan C. Aguado[1], Venkata K. Yedugundla[2], Marianna Angelou[3], Noemí Merayo[1], Patricia Fernández[1], Neftis Atallah[4], Rubén M. Lorenzo[1], Antonio Francescon[2], Ioannis Tomkos[3], Evaristo J. Abril[1] [1] UVa, [2] CREATE-NET, [3] AIT, [4] CEDETEL
ABSTRACT	The European Union FP7 CHRON project addresses the challenge of controlling and managing the next generation of heterogeneous optical networks supporting the Future Internet. For that aim, the CHRON project proposes a Cognitive Heterogeneous Reconfigurable Optical Network, which observes, acts, learns and optimizes its performance. The core element of such network is the Cognitive Decision System, which makes decisions on how to deal with traffic demands and network events by using knowledge acquired from previous experience and considering the current network status. In this paper, we present the architecture of this Cognitive Decision System, and then show a set of methods developed for two of its building blocks: the Virtual Topology Design module and the Quality of Transmission (QoT) estimator module. Regarding the former module, we present two multiobjective genetic algorithms to solve the impairment-aware virtual topology design problem, and evaluate their performance under realistic traffic demands. Results show that one of the methods, which is enhanced with additional cognition, leads to better results. For the latter module, we present a cognitive QoT estimator, which achieves more than 99% successful classifications of optical connections into high or low QoT categories, and is much faster for on-line operation than an existing approach.

LANGUAGE	English
PUBLICATION	IEEE
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6294211

Table 23 Future Network & Mobile Summit 2012

TITLE OF THE EVENT	Future Network & Mobile Summit 2012
LOCATION	Berlin, Germany
DATE	4th – 6th July 2012
TITLE OF THE CONTRIBUTION	Workshop: Optical Networks Standardization in FP7 projects Challenges of Cognitive Networks Standardization - CHRON
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference presentation
AUTHORS AND PARTNER INVOLVED	Andrzej Tymecki[1] [1]TPSA
ABSTRACT	
LANGUAGE	English
PUBLICATION	
ADDITIONAL COMMENTS	

Table 24 Future Network & Mobile Summit 2012

TITLE OF THE EVENT	Photonics in Switching 2012
LOCATION	Ajaccio, Corsica Island, France
DATE	11th – 14th September 2012
TITLE OF THE CONTRIBUTION	Enabling technologies for evolving flexible/elastic optical transmission and expected benefits from their introduction in the networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Invited Talk
AUTHORS AND PARTNER INVOLVED	I. Tomkos[1], P. Zakynthinos[1], Ch. Kachris[1], E. Palkopoulou[1], M. Angelou[1], D. Klonidis[1] [1]AIT
ABSTRACT	Flexible optical networking is widely proposed today by major vendors and operators as a solution that offers smooth system upgradability towards Tb/s capacities and optimized use of network resources. Latest research and development efforts proposed a variety of multi-carrier signal transmission methods with significantly increased spectral efficiency, (compared to legacy WDM), allowing the transport of ultra-high capacity channels and the adaptive filling of wavelength channels according to the demands and the required performance on a link distance basis. These developments enable the flexible bandwidth utilization of the optical links but are limited to the point-to-point transport of data. The key network elements required to truly enable the realization of a flexible optical networking system are the flexible transceivers and flexible switching nodes capable to adaptively generate, receive add/drop and switch tributaries with variable bandwidth characteristics.
LANGUAGE	English
PUBLICATION	Proceeding of the conference/IEEE
ADDITIONAL COMMENTS	

Table 25 Photonics in Switching 2012

TITLE OF THE EVENT	Workshop on Flexible and cognitive optical networking
LOCATION	Amsterdam, The Netherlands, ECOC 2012
DATE	16th September 2012
TITLE OF THE CONTRIBUTION	Flexible cognitive optical networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Organization of the Workshop
AUTHORS AND PARTNER INVOLVED	Idelfonso T. Monroy[1], Ioannis Tomkos[2] [1]DTU, [2]AIT
ABSTRACT	Flexgrid link components and elastic bit rate transceivers are a very hot topic now and for the few past years we could witness their development from merely concepts towards successful commercialization. However, the deployment in an optical network infrastructure is years ahead. One of the limiting factors is the fact that currently deployed control planes are already very complex and expensive to operate and manage and adding more degrees of freedom will make this situation even worse. On the other hand, in order to gain any benefit from the flexible-elastic implementation of the physical plane, the control plane has to be capable. One of the possible answers is the introduction of cognition into the control plane as well. Applied to optical networking, it is a relatively novel concept reimplemented from the cognitive radio scenario. A cognitive control plane is used to control flexible elastic optical transceivers and components with the view to enable efficient resource utilization in flexible networking, reduce energy consumption and footprint, reduce the control plane burden by enabling semi- or fully autonomous control plane operation. Cognition in the control plane however, has to be aided by a wide array of cognition-enabling techniques implemented starting from the physical layer up to the application layer. This workshop will assess the current status of cognition as a technique supporting flexible optical networking. Speakers include leading experts from academia and industry, representing Europe, Americas and Asia. The workshop will present latest development but also point out and discusses challenges in realizing future optical networks with dynamic

	resource allocation and cognitive control.
LANGUAGE	English
PUBLICATION	
ADDITIONAL COMMENTS	http://www.ecoc2012.org/programme_workshops.asp#ws05

Table 26 CHRON Workshop at ECOC 2012

TITLE OF THE EVENT	ECOC 2012: Workshop on Flexible Cognitive Optical Networks
LOCATION	Amsterdam, The Netherlands
DATE	16th September 2012
TITLE OF THE CONTRIBUTION	The EU CHRON Project: Cognitive Heterogeneous Reconfigurable Optical Network
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Presentation in the Workshop
AUTHORS AND PARTNER INVOLVED	Ignacio de Miguel[1] [1]UVa
ABSTRACT	
LANGUAGE	English
PUBLICATION	
ADDITIONAL COMMENTS	

Table 27 ECOC 2012

TITLE OF THE EVENT	ECOC 2012: Workshop on Software Defined Photonics
LOCATION	Amsterdam, The Netherlands
DATE	16th September 2012
TITLE OF THE CONTRIBUTION	Network Performance Evaluation for Nyquist-WDM-Based Flexible Optical Networking
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	E. Palkopoulou[1], D. Klonidis, I. Tomkos[1] [1]AIT
ABSTRACT	We focus on the spectrally efficient Nyquist-WDM concept and quantify the effect of physical layer design parameters on the network level performance. Case studies are conducted on a realistic reference network under different traffic demand settings and trade-offs with respect to the utilized spectrum and the required transponders are identified.
LANGUAGE	English
PUBLICATION	ECOC Technical Digest © 2012 OSA
ADDITIONAL COMMENTS	http://www.opticsinfobase.org/abstract.cfm?URI=ECEOC-2012-Mo.1.D.2

Table 28 ECOC 2012 (II)

TITLE OF THE EVENT	ECOC 2012
LOCATION	Amsterdam, The Netherlands
DATE	19th September 2012
TITLE OF THE CONTRIBUTION	Experimental Demonstration of a Cognitive Quality of Transmission Estimator for Optical Communication Systems
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Paper
AUTHORS AND PARTNER INVOLVED	Antonio Caballero[1], Juan Carlos Aguado[2], Robert Borkowski[1], Silvia Saldaña[1], Tamara Jiménez[2], Ignacio de Miguel[2], Valeria Arlunno[1], Ramón J. Durán[2], Darko Zibar[1], Jesper Bevensee Jensen[1], Rubén M. Lorenzo[2], Evaristo J. Abril[2], Idelfonso Tafur Monroy[1] [1] DTU, [2] UVa
ABSTRACT	We report on the experimental performance of a case-based reasoning technique to predict whether optical channels fulfill quality of transmission requirements, thus supporting impairment-aware networking. Validation is performed in a WDM 80 Gb/s PDM-QPSK testbed.
LANGUAGE	English
PUBLICATION	ECOC Technical Digest © 2012 OSA
ADDITIONAL COMMENTS	http://www.opticsinfobase.org/abstract.cfm?URI=ECEOC-2012-We.2.D.3

Table 29 ECOC 2012 (III)

TITLE OF THE EVENT	ECOC 2012
LOCATION	Amsterdam, The Netherlands
DATE	19th September 2012
TITLE OF THE CONTRIBUTION	Training-based Channel Estimation for Signal Equalization and OPM in 16-QAM Optical Transmission Systems
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Poster
AUTHORS AND PARTNER INVOLVED	Fabio Pittalà[1], Fabian N. Hauske, Yabin Ye[1], Idelfonso T. Monroy[2], Josef A. Nossek [1] HWDU, [2] DTU
ABSTRACT	Efficient channel estimation for signal equalization and OPM based on short CAZAC sequences with QPSK and 8PSK constellation formats is demonstrated in a 224-Gb/s PDM 16-QAM optical linear transmission system.
LANGUAGE	English
PUBLICATION	ECOC Technical Digest © 2012 OSA
ADDITIONAL COMMENTS	http://www.opticsinfobase.org/abstract.cfm?URI=ECEOC-2012-P3.16

Table 30 ECOC 2012 (IV)

TITLE OF THE EVENT	ECOC 2012
LOCATION	Amsterdam, The Netherlands
DATE	19th September 2012
TITLE OF THE CONTRIBUTION	On the Energy Efficiency of Survivable Optical Transport Networks with Flexible-grid
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Poster
AUTHORS AND PARTNER INVOLVED	Jorge López, Yabin Ye[1], Víctor López, Felipe Jiménez, Raúl Duque, Peter M. Krummrich [1] HWDU
ABSTRACT	An energy efficiency comparison of conventional path protection schemes for fixed-grid WDM and flexible-grid OFDM-based networks has been carried out. The survivable elastic network with SP scheme was found to offer the best energy efficiency per GHz at any traffic load value.
LANGUAGE	English
PUBLICATION	ECOC Technical Digest © 2012 OSA
ADDITIONAL COMMENTS	http://www.opticsinfobase.org/abstract.cfm?URI=ECEOC-2012-P5.05

Table 31 ECOC 2012 (V)

TITLE OF THE EVENT	Photonics Conference (IPC), 2012 IEEE
LOCATION	Burlingame, California, USA
DATE	23rd – 27th September 2012
TITLE OF THE CONTRIBUTION	Frequency Domain Training-Aided Channel Estimation and Equalization in Time-Varying Optical Transmission Systems
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Paper
AUTHORS AND PARTNER INVOLVED	Fabio Pittalà[1], Majdi Msallem, Fabian N. Hauske[1], Yabin Ye[1], Idelfonso T. Monroy[2], Josef A. Nossek [1] HWDU,[2] DTU
ABSTRACT	We propose a non-weighted feed-forward equalization method with filter update by averaging channel estimations based on short CAZAC sequences. Three averaging methods are presented and tested by simulations in a time-varying 2×2 MIMO optical system.
LANGUAGE	English
PUBLICATION	IEEE
ADDITIONAL COMMENTS	DOI: 10.1109/IPCon.2012.6358689

Table 32 IPC 2012

TITLE OF THE EVENT	4th International Workshop on Reliable Networks Design and Modeling (RNDM 2012)
LOCATION	St. Petersburg, Russia
DATE	5th October 2012
TITLE OF THE CONTRIBUTION	Survivable and Impairment-Aware Virtual Topologies for Reconfigurable Optical Networks: a Cognitive Approach
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference Paper
AUTHORS AND PARTNER INVOLVED	N. Fernández[1], R. J. Durán[1], I. de Miguel[1], N. Merayo[1], J. C. Aguado[1], P. Fernández[1], T. Jiménez[1], I. Rodríguez[1], D. Sánchez[1], R. M. Lorenzo[1], E. J. Abril[1], M. Angelou[2], I. Tomkos[2] [1]UVa, [2]AIT
ABSTRACT	This paper presents a new version of a multiobjective genetic algorithm to design virtual topologies with the aim of reducing both the energy consumption and the network congestion.
LANGUAGE	English
PUBLICATION	IEEE Xplore
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6459771

Table 33 RNDM 2012

TITLE OF THE EVENT	4th International Congress on Ultra Modern Telecommunications and Control Systems and Workshops (ICUMT 2012)
LOCATION	St. Petersburg, Russia
DATE	3rd -5th October 2012
TITLE OF THE CONTRIBUTION	NICER: A distributed dynamic shared-backup path-allocation procedure for transmission-impaired WDM optical networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference Paper
AUTHORS AND PARTNER INVOLVED	E. Salvadori[1], A. Zanardi[1], D. Siracusa[1], G. Galimberti[1], G. Martinelli[1], O. Gerstel[1] [1]CREATE-NET
ABSTRACT	Survivability in transparent optical networks is a critical concern for network operators. Current survivability techniques for shared protection are mainly based on a centralized off-line pre-planning of the lightpaths. In addition, the presence of Physical Layer Impairments (PLIs) and multi-channel effects must be accurately considered. In this paper we propose a distributed on-line procedure called NICER to allocate shared backup capacity in transmission-impaired optical transparent networks. To this account, we present the on-line algorithms useful to setup the Label Switched Paths (LSPs) in a Generalized MPLS (GMPLS) controlled network and to choose the wavelengths to be eventually shared by the backup lightpaths, given the information about the PLIs distributed in the network. Furthermore, through some simulations we show the performance of the proposed survivability procedure.
LANGUAGE	English
PUBLICATION	IEEE Xplore
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6459756

Table 34 ICUMT 2012

TITLE OF THE EVENT	SPIE OPTO 2013, Photonic West
LOCATION	San Francisco, California
DATE	5th February 2013
TITLE OF THE CONTRIBUTION	Cognition-Enabling Techniques in Heterogeneous and Flex-grid Optical Communication Networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Invited Paper
AUTHORS AND PARTNER INVOLVED	Idelfonso Tafur Monroy[1], Antonio Caballero[1], Silvia Saldaña Cercós[1], Robert Borkowski[1] [1]DTU
ABSTRACT	High degree of heterogeneity of future optical networks, such as services with different quality-of-transmission requirements, modulation formats and switching techniques, will pose a challenge for the control and optimization of different parameters. Incorporation of cognitive techniques can help to solve this issue by realizing a network that can observe, act, learn and optimize its performance, taking into account end-to-end goals. In this letter we present the approach of cognition applied to heterogeneous optical networks developed in the framework of the EU project CHRON: Cognitive Heterogeneous Reconfigurable Optical Network. We focus on the approaches developed in the project for optical performance monitoring and power consumption models to implement an energy efficient network.
LANGUAGE	English
PUBLICATION	Proceedings Volume 8646: Optical Metro Networks and Short-Haul Systems V
ADDITIONAL COMMENTS	http://dx.doi.org/10.1117/12.2010030

Table 35 SPIE OPTO 2013

TITLE OF THE EVENT	Future Networks 10th Concertation Meeting
Location	Brussels, Belgium
DATE	27th – 28th February 2013
TITLE OF THE CONTRIBUTION	Cognitive Heterogeneous Reconfigurable Optical Networks (CHRON)
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Oral presentation
AUTHORS AND PARTNER INVOLVED	Ignacio Rodríguez UVa
ABSTRACT	Session where each participant announced any recent significant development. The idea was mutual dissemination of results of possible mutual interest. Each project representative undertook and announcement or a very short presentation, based on a subset of questions.
LANGUAGE	English
PUBLICATION	
ADDITIONAL COMMENTS	

Table 36 Future Networks 10th Concertation Meeting

TITLE OF THE EVENT	9th International Conference on Design of Reliable Communication Networks (DRCN 2013)
LOCATION	Budapest, Hungary
DATE	4th – 7th March 2013
TITLE OF THE CONTRIBUTION	Quality of protection schemes with extended flexibility for improved energy efficiency in transport networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Invited conference paper
AUTHORS AND PARTNER INVOLVED	J. López Vizcaíno[1], Y. Ye, F. Jiménez[1], R. Duque, F. Musumeci, M. Tornatore, P.M. Krummrich, A. Pattavina [1]HWDU
ABSTRACT	In this paper we evaluate the potential of Quality of Protection (QoP) schemes to improve the energy efficiency in optical transport networks. Different levels of flexibility, both in the digital and optical domains, are considered for simulations over a nation-wide reference network model. Increasing power savings are achieved as long as the flexibility levels become higher, demonstrating the benefits of QoP deployments to accomplish power consumption reduction.
LANGUAGE	English
PUBLICATION	IEEE
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=06529872

Table 37 DRCN 2013

TITLE OF THE EVENT	Optical Fiber Communication Conference 2013 (OFC 2013)
Location	Anaheim, CA, USA
DATE	17th-21st March 2013
TITLE OF THE CONTRIBUTION	Cognitive Dynamic Optical Networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	Ignacio de Miguel[1], Ramón J. Durán[1], Rubén M. Lorenzo[1], Antonio Caballero[2], Idelfonso Tafur Monroy[2], Yabin Ye[3], Andrzej Tymecki[4], Ioannis Tomkos[5], Marianna Angelou[5], Dimitrios Klonidis[5], Antonio Francescon[6], Domenico Siracusa[6], Elio Salvadori[6] [1]UVa, [2]DTU, [3]HWDU, [4]TP SA, [5]AIT, [6]CREATE-NET
ABSTRACT	Cognitive networks are a promising solution for the control of heterogeneous optical networks. We review their fundamentals as well as a number of applications developed in the framework of the EU FP7 CHRON project.
LANGUAGE	English
PUBLICATION	Conference Proceedings
ADDITIONAL COMMENTS	http://dx.doi.org/10.1364/OFC.2013.OW1H.1

Table 38 OFC 2013

TITLE OF THE EVENT	Optical Fiber Communication Conference 2013 (OFC 2013)
LOCATION	Anaheim, CA, USA
DATE	17th-21st March 2013
TITLE OF THE CONTRIBUTION	Dynamic Cooperative Spectrum Sharing in Elastic Networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	Eleni Palkopoulou[1], Ioannis Stiakogiannakis[1], Dimitrios Klonidis[1], Konstantinos Christodoulopoulos, Emmanouel Varvarigos, Ori Gerstel, and Ioannis Tomkos[1] [1]AIT
LANGUAGE	English
PUBLICATION	Conference Proceedings
ADDITIONAL COMMENTS	http://dx.doi.org/10.1364/OFC.2013.OTu3A.2

Table 39 OFC 2013 (II)

TITLE OF THE EVENT	Optical Fiber Communication Conference 2013 (OFC 2013)
Location	Anaheim, CA, USA
DATE	17th-21st March 2013
TITLE OF THE CONTRIBUTION	Optical Modulation Format Recognition in Stokes Space for Digital Coherent Receivers
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	Robert Borkowski[1], Darko Zibar[1], Antonio Caballero[1], Valeria Arlunno[1], Idelfonso Tafur Monroy[1] [1]DTU
ABSTRACT	We report on a novel method for optical modulation format recognition based on Stokes parameters and variational expectation maximization algorithm. Discrimination among six different pol-muxed coherent modulation formats is successfully demonstrated in simulation and experiment.
LANGUAGE	English
PUBLICATION	Conference Proceedings
ADDITIONAL COMMENTS	http://dx.doi.org/10.1364/OFC.2013.OTh3B.3

Table 40 OFC 2013 (III)

TITLE OF THE EVENT	OFC2013
LOCATION	Anaheim, CA, USA
DATE	19th – 21st March 2013
TITLE OF THE CONTRIBUTION	Interplay of Filtering and Nonlinear Transmission in Coherent Uncompensated DWDM System
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference Paper
AUTHORS AND PARTNER INVOLVED	Yabin Ye[1], Gernot Goeger[1], Enbo Zhou, Sen Zhang, Xiaogeng Xu [1]HWDU
ABSTRACT	We propose an engineering method for OSNR penalty estimation for non-linear transmission of 112Gb/s PDM-DQPSK WDM signals over uncompensated links incorporating WSSes. Simulations and experimental results validate the method.
LANGUAGE	English
PUBLICATION	IEEE
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=06532784

Table 41 OFC 2013 (IV)

TITLE OF THE EVENT	OFC2013
LOCATION	Anaheim, CA, USA
DATE	19th – 21st, March, 2013
TITLE OF THE CONTRIBUTION	Differentiated Quality of Protection to Improve Energy Efficiency of Survivable Optical Transport Networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference Paper
AUTHORS AND PARTNER INVOLVED	Jorge Lopez Vizcaino[1], Yabin Ye[1], Victor Lopez, Felipe Jimenez, Raul Duque, Francesco Musumeci, Achille Pattavina, Peter Krummrich [1]HWDU
ABSTRACT	A differentiated quality of protection scheme is evaluated in terms of energy efficiency for fixed-grid WDM and flexible-grid OFDM-based networks. Significant energy savings can be achieved by exploiting the heterogeneous protection requirements.
LANGUAGE	English
PUBLICATION	IEEE
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=06532775

Table 42 OFC 2013 (V)

TITLE OF THE EVENT	ONDM 2013
LOCATION	Brest, France
DATE	16th -19th April 2013
TITLE OF THE CONTRIBUTION	Experimental Demonstration of a PCE for Wavelength-Routed Optical Burst-Switched (WR-OBS) Networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	Oscar González, Juan Palacios, Ignacio de Miguel[1], Juan Carlos Aguado[1], Noemí Merayo[1], Ramón José Durán[1], Patricia Fernández[1], Rubén Mateo Lorenzo[1], Evaristo José Abril[1] [1] UVa
ABSTRACT	Despite what the name may suggest, Wavelength-Routed Optical Burst-Switched networks (WR-OBS) are in fact highly dynamic optical circuit-switched networks, where requests for lightpath establishment are triggered by the arrival of data at the edge routers. While a WR-OBS, like any other wavelength-routed network, can benefit from the Path Computation Element (PCE) technology for route calculations, its high dynamism requires the introduction of a number of upgrades and extensions on the PCE and on its associated protocol (PCEP). Thus, we have designed, implemented and experimentally validated a novel PCE architecture for fast circuit-switched networks, like WR-OBS. Therefore, we discuss the key challenges when implementing a PCE for such a highly dynamic network, as well as the PCEP extensions required. Since PCEP runs on top of the TCP protocol, we also analyze the impact of the combination of two TCP features -delayed acknowledgment and the Nagle algorithm- on the performance of the PCEP protocol. Furthermore, we describe the implementation of an emulated experimental setup to validate and evaluate the performance of the new PCE architecture, and demonstrate its feasibility.
LANGUAGE	English
PUBLICATION	Optical Network Design and Modeling (ONDM), 2013 17th

	International Conference on
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6524921

Table 43 ONDM2013

TITLE OF THE EVENT	Future Internet Assembly (FIA) 2013
LOCATION	Dublin, Ireland
DATE	8th – 10th May 2013
TITLE OF THE CONTRIBUTION	Cognitive Heterogeneous Reconfigurable Optical Network
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Poster
AUTHORS AND PARTNER INVOLVED	R. M. Lorenzo[1], R. J. Durán[1] [1]UVa
ABSTRACT	
LANGUAGE	English
PUBLICATION	
ADDITIONAL COMMENTS	

Table 44 FIA 2013

TITLE OF THE EVENT	ICTON 2013
LOCATION	Cartagena, Spain
DATE	23rd - 27th June 2013
TITLE OF THE CONTRIBUTION	On the cost efficiency of flexible optical networking compared to conventional SLR/MLR WDM networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	E. Palkopoulou, I. Stiakogiannakis, I. Tomkos [1]AIT
ABSTRACT	Flexible optical networking solutions try to utilize the available amplifier's bandwidth/spectrum more effectively (compared to the fixed-grid WDM counterparts) by properly adapting the channel capacity to the actual traffic requirements of each connection at any given point in time (as this is the case in wireless networks where bandwidth was always considered as a scarce resource). The flexibility in dynamic bandwidth allocation is enabled by novel physical layer technologies and advanced algorithms that take advantage of the new capabilities of the optical layer. In this paper we provide detailed justification on the cost-benefits introduced in core networks due to the added flexibility from elastic software-defined network technologies.
LANGUAGE	English
PUBLICATION	IEEE
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6602828

Table 45 ICTON 2013 (I)

TITLE OF THE EVENT	15th International Conference on Transparent Optical Networks (ICTON 2013)
Location	Cartagena, Spain
DATE	23rd - 27th June 2013
TITLE OF THE CONTRIBUTION	Performance Monitoring Techniques Supporting Cognitive Optical Networking
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Invited paper
AUTHORS AND PARTNER INVOLVED	Antonio Caballero[1], Robert Borkowski[1], Darko Zibar[1], Idelfonso Tafur Monroy[1] [1]DTU
ABSTRACT	High degree of heterogeneity of future optical networks, such as services with different quality-of-transmission requirements, modulation formats and switching techniques, will pose a challenge for the control and optimization of different parameters. Incorporation of cognitive techniques can help to solve this issue by realizing a network that can observe, act, learn and optimize its performance, taking into account end-to-end goals. In this letter we present the approach of cognition applied to heterogeneous optical networks developed in the framework of the EU project CHRON: Cognitive Heterogeneous Reconfigurable Optical Network. We focus on the approaches developed in the project for optical performance monitoring, which enable the feedback from the physical layer to the cognitive decision system by providing accurate description of the performance of the established lightpaths.
LANGUAGE	English
PUBLICATION	Conference Proceedings
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6602786

Table 46 ICTON 2013 (II)

TITLE OF THE EVENT	OptoElectronics and Communications Conference held jointly with 2013 International Conference on Photonics in Switching (OECC/PS)
LOCATION	Kyoto, Japan
DATE	30th June- 4th July, 2013
TITLE OF THE CONTRIBUTION	QoT prediction for core networks with uncompensated coherent transmission
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	M. Angelou, P.N Ji, T. Wang, I. Tomkos[1] [1]AIT
ABSTRACT	We propose a comprehensive QoT prediction tool based on fast analytical modeling for on-the-fly signal assessments in networks with uncompensated coherent systems and confirm its superiority in reducing over-engineering compared to system-reach methods.
LANGUAGE	English
PUBLICATION	IEEE
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=6597372&url=http%3A%2F%2Fieeexplore.ieee.org%2Fxpls%2Fabs_all.jsp%3Farnumber%3D6597372

Table 47 OptoElectronics and Communications Conference and International Conference on Photonics in Switching (OECC/PS)

TITLE OF THE EVENT	Future Network & Mobile Summit 2013 workshop: Workshop on Future Wired and Wireless Networks: Green, Heterogeneous and Cloud-powered
LOCATION	Lisbon, Portugal
DATE	3rd -5th July 2013
TITLE OF THE CONTRIBUTION	Differentiated quality of protection schemes for improved energy efficiency in optical transport networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Presentation in the Workshop
AUTHORS AND PARTNER INVOLVED	Jorge López Vizcaíno[1], Yabin Ye[1], Felipe Jiménez, Víctor López [1]HWDU
ABSTRACT	
LANGUAGE	English
PUBLICATION	
ADDITIONAL COMMENTS	http://www.futurenetworksummit.eu/2013/default.asp?page=schedule-view&schedule.expanded=yes&schedule.day.pos=2

Table 48 Future Network and Mobile Summit 2013

TITLE OF THE EVENT	Future Network & Mobile Summit 2013 workshop: Future Wired and Wireless Networks: Green, Heterogeneous and Cloud-powered
LOCATION	Lisbon, Portugal
DATE	3rd -5th July 2013
TITLE OF THE CONTRIBUTION	Cognitive Heterogeneous Reconfigurable Optical Network: A Techno-Economic Evaluation
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Presentation in the Workshop
AUTHORS AND PARTNER INVOLVED	Eleni Palkopolou[1], Ioannis Stiakogiannakis[1], Dimitrios Klonidis[1], Tamara Jiménez[2], Natalia Fernández[2], Juan Carlos Aguado[2], Jorge López[3], Yaving Ye[3], Ioannis Tomkos[1] [1]AIT, [2]UVa, [3]HWDU
ABSTRACT	This paper examines the Cognitive Heterogeneous Reconfigurable Optical Network architecture from a techno-economic perspective. In order to monetize the benefits stemming from the proposed architecture, a techno-economic analysis is presented along with a cost model that considers both capital and operational expenditures. The study shows that the relative benefits of flexible networking increase for higher traffic demands – when comparing with single-line-rate (SLR) and multi-line-rate (MLR) solutions. The use of cognitive techniques can also lead to economic advantages. We focus on the impact of cognitive QoT estimation, and demonstrate that the revenues obtained by the network operator are increased if the cognitive QoT estimator is combined with adaptive routing and wavelength assignment mechanisms. Moreover, the results obtained when the cognitive QoT estimator is used are very close to the ideal case.
LANGUAGE	English
PUBLICATION	Conference proceedings
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6633591&refinements%3D4281335126%26sortType%3Dasc_p_S

	equence%26filter%3DAND%28p_IS_Number%3A6633516%29

Table 49 Future Network and Mobile Summit 2013

TITLE OF THE EVENT	NOC/OC&I 2013
LOCATION	Graz, Austria
DATE	10th -12th July 2013
TITLE OF THE CONTRIBUTION	Toward a control and management system enabling cognitive optical networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	D. Siracusa[1], A. Broglio[1], A. Francescon[1], A. Zanardi[1], E. Salvadori[1] [1]CREATE-NET
ABSTRACT	Cognition represents one of the ingredients to make up the future high-capacity heterogeneous optical networks. This paper provides three main contributions for a preliminary study of a Control and Management System (CMS) able to support the cognitive entity, named Cognitive Decision System (CDS). First of all, two architectural approaches to realize a cognitive optical network are presented. Secondly, the focus is set on the description of a centralized GMPLS-based CMS architecture and on the interactions between its modules and the CDS. In particular, the CDS decisions rely on a database updated by CMS protocols (i.e., by OSPF - TE) to grasp information about network configuration and resources availability. Unfortunately, OSPF - TE may not be able to timely update the CDS-database. To address this issue, the paper presents two CDS-database updating policies and compares their performance through simulations. Finally, a set of open issues and challenges is detailed in order to provide an input for a deep analysis of the presented CMS architecture.
LANGUAGE	English
PUBLICATION	Conference proceedings
ADDITIONAL COMMENTS	http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6582895

Table 50 NOC/OC&I

TITLE OF THE EVENT	Optics & Photonics Congress, Photonic Networks and Devices (NETWORKS)
LOCATION	Río Grande, Puerto Rico
DATE	July 2013
TITLE OF THE CONTRIBUTION	The Rise of Flexible Optical Networking
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Invited Paper
AUTHORS AND PARTNER INVOLVED	I. Tomkos[1] [1]AIT
LANGUAGE	English
PUBLICATION	Conference proceedings
ADDITIONAL COMMENTS	

Table 51 Photonic Networks and Devices (NETWORKS)

TITLE OF THE EVENT	5th International Workshop on Reliable Networks Design and Modeling
LOCATION	Almaty, Kazakhstan
DATE	10th -12th September 2013
TITLE OF THE CONTRIBUTION	Virtual Topology Design and Reconfiguration using Cognition: Performance Evaluation in Case of Failure
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Short paper
AUTHORS AND PARTNER INVOLVED	Natalia Fernández[1], Ramón J. Durán[1], Ignacio de Miguel[1], Eleni Palkopoulou[2], Noemí Merayo[1], Patricia Fernández[1], Juan Carlos Aguado[1], Ioannis Tomkos[2], Rubén M. Lorenzo[1], Evaristo J. Abril[1] [1]UVa, [2]AIT
ABSTRACT	In this paper, a new reconfiguration policy and a new algorithm for the virtual topology design, named CONGA-VTD (Cost-OptimizatioN Genetic Algorithm for Virtual Topology Design) for Wavelength-Routed Optical Networks are proposed. The objectives of both proposals are to minimize the Packet Loss Ratio (PLR) and the OPerational EXpenditures (OPEX). A simulation study is presented to demonstrate the advantages of the new techniques in both normal operation and in presence of failures. The reconfiguration policy is compared to two static ones to determine the benefits of the reconfiguration process in terms of PLR, OPEX and resources in operation.
LANGUAGE	English
PUBLICATION	Conference proceedings
ADDITIONAL COMMENTS	

Table 52 RNDM

TITLE OF THE EVENT	21th International Conference on Software, Telecommunications and Computer Networks (SoftCom2013)
LOCATION	Split, Croatia
DATE	18th – 20th Sept. 2013
TITLE OF THE CONTRIBUTION	Energy-efficient and Low Blocking Differentiated Quality of Protection Scheme for Dynamic Elastic Optical Networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Paper
AUTHORS AND PARTNER INVOLVED	Jorge López Vizcaíno[1], Paola Soto, Yabin Ye[1], Felipe Jiménez, Víctor López, Peter M. Krummrich [1]HWDU
ABSTRACT	A differentiated quality of protection scheme is proposed to improve the energy efficiency and reduce blocking in future all-dynamic optical transport networks operating on a flexible-grid. Simulation results show significant energy efficiency improvements and a notable lower blocking ratio of this novel scheme with respect to dedicated protection 1+1.
LANGUAGE	English
PUBLICATION	IEEE
ADDITIONAL COMMENTS	

Table 53 SoftCom2013

TITLE OF THE EVENT	ECOC2013
LOCATION	London, UK
DATE	22nd – 26th Sept. 2013
TITLE OF THE CONTRIBUTION	Influence of Embodied Energy in the Energy Efficiency of Optical Transport Networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	Javier Mata[1, 2], Yabin Ye[1], Jorge López[1], Idelfonso T. Monroy[2] [1]HWDU, [2]DTU
ABSTRACT	An energy model including both operational and embodied energy is proposed to evaluate the performance evolution of optical transport networks in a multi-period study up to 15 years. Significant energy efficiency per GHz improvements and energy reductions can be achieved for flexible-grid OFDM-based networks with respect to fixed-grid WDM ones.
LANGUAGE	English
PUBLICATION	
ADDITIONAL COMMENTS	

Table 54 ECOC 2013

TITLE OF THE EVENT	ECOC2013
LOCATION	London, UK
DATE	22nd – 26th Sept. 2013
TITLE OF THE CONTRIBUTION	Energy- and Cost-Efficient Protection in Core Networks by a Differentiated Quality of Protection Scheme
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	Jorge López[1], Yabin Ye[1], Felipe Jiménez, Peter M. Krummrich [1]HWDU
ABSTRACT	A differentiated quality of protection scheme is proposed as an energy-and cost-efficient protection strategy for long-haul optical networks. Significant energy efficiency per GHz improvements and CapEx reductions can be achieved for both fixed-grid WDM and flexible-grid networks.
LANGUAGE	English
PUBLICATION	©2013 IET Services Limited
ADDITIONAL COMMENTS	

Table 55 ECOC 2013 (II)

TITLE OF THE EVENT	ECOC2013
LOCATION	London, UK
DATE	24th September 2013
TITLE OF THE CONTRIBUTION	Techno-Economic Advantages of Cognitive Virtual Topology Design
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	N. Fernández[1], R. J. Durán[1], E. Palkopoulou[2], I. de Miguel[1], I. Stiakogiannakis[2], N. Merayo[1], I. Tomkos[2], R. M. Lorenzo[1] [1]UVa, [2]AIT
ABSTRACT	We demonstrate that the introduction of cognitive techniques in virtual topology design leads to significant savings in terms of the total cost of ownership compared to conventional methods. Case study results indicate that capital and operational expenditures can be respectively reduced by up to 20% and 25% via a genetic algorithm-based method.
LANGUAGE	English
PUBLICATION	©2013 IET Services Limited
ADDITIONAL COMMENTS	

Table 56 ECOC 2013 (III)

TITLE OF THE EVENT	ECOC2013
LOCATION	London, UK
DATE	25th September 2013
TITLE OF THE CONTRIBUTION	Minimization of the Impact of the TED Inaccuracy Problem in PCE-Based Networks by Means of Cognition
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	I.Rodriguez[1], R. J. Durán[1], D. Siracusa[2], I. de Miguel[1], A. Francescon[2], J. C. Aguado[1], E. Salvadori[2], R. M. Lorenzo[1] [1]UVa, [2]CREATE-NET
ABSTRACT	We propose and demonstrate the benefits of a simple yet effective cognitive technique to enhance stateless Path Computation Element (PCE) algorithms with the aim of reducing the connection blocking probability when relying on a potentially non up-to-date Traffic Engineering Database (TED).
LANGUAGE	English
PUBLICATION	©2013 IET Services Limited
ADDITIONAL COMMENTS	

Table 57 ECOC 2013 (IV)

TITLE OF THE EVENT	OFC 2014
LOCATION	San Francisco, USA
DATE	9th -13th March 2014
TITLE OF THE CONTRIBUTION	Advanced Modulation Formats in Cognitive Optical Networks: EU project CHRON Demonstration
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper (submitted)
AUTHORS AND PARTNER INVOLVED	R. Borkowski[1], A. Caballero[1], D. Klonidis[2], C. Kachris[2], A. Francescon[3], I. de Miguel[4], R.J. Durán[4], D. Zibar[1], I. Tomkos[2], I. Tafur Monroy[1] [1]DTU, [2]AIT, [3]CREATE-NET, [4]UVa
ABSTRACT	We demonstrate real-time path establishment and switching of coherent modulation formats (QPSK, 16QAM) within an optical network driven by cognitive algorithms. Cognition aims at autonomous configuration optimization to satisfy quality of transmission requirements.
LANGUAGE	English
PUBLICATION	IEEE/OSA (submitted)
ADDITIONAL COMMENTS	Paper under revision

Table 58 OFC 2014(I)

TITLE OF THE EVENT	OFC 2014
LOCATION	San Francisco, USA
DATE	9th -13th March 2014
TITLE OF THE CONTRIBUTION	Experimental Evaluation of Virtual Topology Design and Reconfiguration in Optical Networks by means of Cognition
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper (submitted)
AUTHORS AND PARTNER INVOLVED	D. Siracusa[1], A. Francescon[1], N. Fernández[2], I. de Miguel[2], R.J. Durán[2], J.C. Aguado[2], E. Salvadori[1] [1]CREATE-NET, [2]UVa
ABSTRACT	The effectiveness of a multi-objective virtual topology design algorithm and a reconfiguration policy supported by cognitive techniques is demonstrated in an emulated testbed deploying a centralized control and management architecture.
LANGUAGE	English
PUBLICATION	IEEE/OSA (submitted)
ADDITIONAL COMMENTS	Paper under revision

Table 59 OFC 2014(II)

TITLE OF THE EVENT	OFC 2014
LOCATION	San Francisco, USA
DATE	9th -13th March 2014
TITLE OF THE CONTRIBUTION	Experimental Demonstration of a Cognitive Optical Network for Reduction of Restoration Time
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper (submitted)
AUTHORS AND PARTNER INVOLVED	C. Kachris[1] , D. Klonidis[1] , A. Francescon[2], D. Siracusa[2] , E. Salvadori[2] , N. Fernández[3] , T. Jiménez[3] , R.J. Durán[3] , I. de Miguel[3] , J.C. Aguado[3] , R.M. Lorenzo[3] , R. Borkowski[4] , A. Caballero[4] , I. Tafur Monroy[4] , Y. Ye[6] , A. Tymecki[5] , I. Tomkos[1] [1]AIT, [2]CREATE-NET, [3]UVa, [4]DTU, [5]HWDU, [6]TP SA
ABSTRACT	The effectiveness of a multi-objective virtual topology design algorithm and a reconfiguration policy supported by cognitive techniques is demonstrated in an emulated testbed deploying a centralized control and management architecture.
LANGUAGE	English
PUBLICATION	IEEE/OSA (submitted)
ADDITIONAL COMMENTS	Paper under revision

Table 60 OFC 2014(III)

TITLE OF THE EVENT	OFC 2014
LOCATION	San Francisco, USA
DATE	9th -13th March 2014
TITLE OF THE CONTRIBUTION	Proactive Restoration of Slow-Failures in Optical Networks based on a Cognitive Approach
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	D. Siracusa[1], F. Pederzolli[1], E. Salvadori[1], R. Lo Cigno[2], I. Tafur Monroy [3] [1]CREATE-NET, [2]University of Trento, [3]DTU
ABSTRACT	A proactive restoration technique triggered by a threshold set in a cognitive fashion to address optical failures with slow transients is presented. Simulations show the superiority of the proposed approach compared to fixed-threshold solutions.
LANGUAGE	English
PUBLICATION	IEEE/OSA (submitted)
ADDITIONAL COMMENTS	Paper under revision.

Table 61 OFC 2014(IV)

TITLE OF THE EVENT	OFC 2014
LOCATION	San Francisco, USA
DATE	9th -13th March 2014
TITLE OF THE CONTRIBUTION	Energy Saving Through Traffic Profiling and Prediction in Self-Optimizing Optical Networks
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	D. Siracusa[1], F. Pederzolli[1], R. Lo Cigno[2], E. Salvadori[1] [1]CREATE-NET, [2]University of Trento
ABSTRACT	A method that automatically learns and predicts the traffic behavior to save energy by adjusting the number of active optical carriers is presented. Simulations prove it provides large savings and ensures low traffic loss probability.
LANGUAGE	English
PUBLICATION	IEEE/OSA (submitted)
ADDITIONAL COMMENTS	Paper under revision.

Table 62 OFC 2014(V)

TITLE OF THE EVENT	ICC 2014
LOCATION	Sidney, Australia
DATE	10th- 14th June 2014
TITLE OF THE CONTRIBUTION	Optimization fo the Use of Resources in a Cognitive Heterogeneous Optical Network
TYPE OF CONTRIBUTION (POSTER, SHORT PAPER…)	Conference paper
AUTHORS AND PARTNER INVOLVED	N. Fernández[1], R.J. Durán[1], I. De Miguel[1], N. Merayo[1], P. Fernández[1], J.C. Aguado[1], R.M. Lorenzo[1], E.J. Abril[1], E. Palkopoulou[2], I. Tomkos[2] [1]UVa, [2]AIT
ABSTRACT	We analyze the problem of resource assingment in the novel Cognitive Heterogeneous Reconfigurable Optical Network (CHRON), assuming that two different switching paradigms (semi-static and dynamic circuit switching) are employed at the same time. Four strategies are proposed to solve that problema. Results show that the network increases its overall performance if both switching paradigms share network resources. Moreover, the use of reconfiguration (using a cognitive virtual topology design technique) can further improve the network performance reducing the cost of the semi-static paradigm and decreasing the network blocking probability of the dynamic connections and, therefore, increasing its revenues.
LANGUAGE	English
PUBLICATION	IEEE (submitted)
ADDITIONAL COMMENTS	Paper under revision.

Table 63 ICC 2014

Annex IV. Detailed description of the other dissemination activities

This annex builds on additional information for the sub-section 2.2.3.

TYPE OF ACTIVITY	Master Thesis
TITLE OF ACTIVITY	Study of energy efficiency in cognitive optical networks
DATE	31 July 2012
LOCATION	Technical University of Denmark
SUMMARY OF THE ACTIVITY	Master Thesis performed in the framework of CHRON activities.
AUTHORS AND PARTNER INVOLVED	Author: Alberto Muñoz Supervisors: Idelfonso Tafur Monroy
LANGUAGE	English
ADDITIONAL COMMENTS	

Table 64 Master Thesis DTU (I)

TYPE OF ACTIVITY	Research Question for PhD. Thesis
TITLE OF ACTIVITY	Cognitive Optical Networks: Semi-static Paradigm Analysis and Optimization
DATE	July 2012
LOCATION	University of Valladolid
SUMMARY OF THE ACTIVITY	Question Research presented in order to submit a PhD. Thesis during the first semester of 2014, and performed in the framework of CHRON activities.
AUTHORS AND PARTNER INVOLVED	Author: Natalia Fernández Sordo Supervisors: Ramón José Durán Barroso
LANGUAGE	Spanish
ADDITIONAL COMMENTS	

Table 65 Research Question UVa

TYPE OF ACTIVITY	Master Thesis
TITLE OF ACTIVITY	Control and Management Strategies in Heterogeneous Optical Networks within the European Project CHRON Framework
DATE	14th September 2012
LOCATION	Universidad de Valladolid, Spain
SUMMARY OF THE ACTIVITY	Master Thesis performed in the framework of CHRON activities.
AUTHORS AND PARTNER INVOLVED	Author: David Sánchez Carabias Supervisors: Ignacio de Miguel Jiménez, Ramón J. Durán Barroso UVa, Universidad de Valladolid
LANGUAGE	English
ADDITIONAL COMMENTS	

Table 66 Master Thesis (UVa)

TYPE OF ACTIVITY	Globecom 2012 Workshop
TITLE OF ACTIVITY	Cost Evaluation for Flexible-Grid Optical Networks
DATE	3rd December 2012
LOCATION	Anaheim, California, USA
SUMMARY OF THE ACTIVITY	We have compared the total cost of an innovative elastic network with respect to the conventional WDM ones operating in realistic network scenarios. The results give an insight of the cost benefits that can be obtained with an elastic OFDM-based network for the operation of future optical transport networks with different protection schemes.
AUTHORS AND PARTNER INVOLVED	Jorge López Vizcaíno[1], Yabin Ye[1], Víctor López, Felipe Jiménez, Raúl Duque, Peter M. Keummrich [1] HWDU, Huawei Technologies Duesseldorf GmbH
LANGUAGE	English
ADDITIONAL COMMENTS	

Table 67 Globecom 2012

TYPE OF ACTIVITY	Master Thesis
TITLE OF ACTIVITY	Energy efficiency in optical core networks
DATE	10 September 2013
LOCATION	Technical University of Denmark Huawei Technologies Duesseldorf GmbH
SUMMARY OF THE ACTIVITY	Master Thesis performed in the framework of CHRON activities.
AUTHORS AND PARTNER INVOLVED	Author: Francisco Javier Mata Gomez Supervisors: Idelfonso Tafur Monroy
LANGUAGE	English
ADDITIONAL COMMENTS	

Table 68 Master Thesis DTU (II)

TYPE OF ACTIVITY	Korea-EU planning workshop on “Future Internet”
TITLE OF ACTIVITY	Cognitive flexible optical networking
DATE	September 2013
LOCATION	Seoul, Korea
SUMMARY OF THE ACTIVITY	The first Korea-EU Technical Workshop was co-organised by the European Union (DG CNECT) and the Ministry of Science, ICT and Future Planning as a follow up of the Korea-EU Joint Science and Technology Cooperation Committee meting took place in this June.
AUTHORS AND PARTNER INVOLVED	I. Tomkos AIT
LANGUAGE	English
ADDITIONAL COMMENTS	

Table 69 Workshop “Future Networks”

TYPE OF ACTIVITY	ECOC'13 workshop on "Architectures and control for elastic optical networks"
TITLE OF ACTIVITY	CHRON architecture
DATE	22nd -26th September 2013
LOCATION	London, UK
SUMMARY OF THE ACTIVITY	Wavelength Switched Optical Networks (WSON) were designed with the premise that all channels in a network have the same spectrum needs, based on the ITU-T DWDM grid. However, this rigid grid-based approach is not adapted to the spectrum requirements of the signals that are best candidates for long-reach transmission and high-speed data rates of 400Gbps and beyond. An innovative approach is to evolve the fixed DWDM grid to a flexible grid, in which the optical spectrum is partitioned into fixed-sized spectrum slices. This allows facilitating the required amount of optical bandwidth and spectrum for an elastic optical connection to be dynamically and adaptively allocated by assigning the necessary number of slices of spectrum. Additionally, since optical networks represent the core substrate responsible for inter-carrier data transport, other key research topics addressed in this area include possibly standardized multicarrier and multivendor control solutions to make more effective and open (i.e. vendor-independent) the current implementations. Furthermore new control plane solutions are necessary to introduce dynamicity, elasticity and adaptation in flexi-grid DWDM networks. This workshop aims to provide an overview of the objectives, framework, functional requirements and use cases of elastic optical network architectures and their control architectures. In particular some the topics to be covered in the workshop are: architectural design and use cases for Elastic Optical Networks, metro and core Flexgrid architectures, IP/MPLS and Flexgrid integration, SDN application in elastic optical networks, control architectures for cognitive optical networks, Flexgrid control plane standardization.
AUTHORS AND PARTNER INVOLVED	I. Tomkos AIT
LANGUAGE	English

ADDITIONAL COMMENTS	

Table 70 Workshop “Arquitectures and control for elastic optical networks”

TYPE OF ACTIVITY	Master Thesis
TITLE OF ACTIVITY	Cognitive Enhancements for Optical Networks Control Planes
DATE	15th October 2013
LOCATION	Università degli studi di Trento, Italy
SUMMARY OF THE ACTIVITY	Master Thesis performed in the framework of CHRON activities. The work proposes some cognitive techniques to enhance the control of optical networks by means of cognition.
AUTHORS AND PARTNER INVOLVED	Author: Federico Pederzolli Supervisors: Domenico Siracusa, Renato Lo Cigno CREATE-NET, Università degli studi di Trento
LANGUAGE	English
ADDITIONAL COMMENTS	

Table 71 Master Thesis CREATE-NET