QUIE^{2}T (247597)

DELIVERABLE D5.1.5

FINAL ACTIVITY REPORT AND PLAN FOR USING AND DISSEMINATION OF KNOWLEDGE

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INTRODUCTION

Executive Summary

The CA QUIE2T aims at strengthening and advancing the European scientific and technological excellence in the field of Quantum Information Foundations and Technologies (QIFT). To achieve this objective, QUIE2T will maintain and expand a set of high-quality coordination measures specifically designed for the QIPC research area. To this purpose the QUIE2T initiative is committed to setting up an ultimately sustainable research architecture and to promoting it at the European level. This architecture will be structured around a set of four Virtual Institutes (VIs), mapped to the major QIPC sub-domains as identified by the scientific and technological roadmap "Quantum Information Processing and Communication: Strategic report on current status, visions and goals for research in Europe" prepared by the QUIE2T predecessor QUROPE. Integration of the VIs is achieved by the execution of the QUIE2T Work-Packages' activities which cut across all the VIs, and in particular by the elaboration of a common vision for the future of the whole QIFT field (and which will be reflected by the update of the aforementioned Strategic Report). In addition QUIE2T will have a proactive role in taking the first steps to ensure the future sustainability of the field. To guarantee that the expertise and the knowledge gained through the CA activities will be of benefit to the European QIFT community (both academic and industrial), QUIE2T will organize a set of activities to spread its results, achievements and excellence. In particular a public web site is one of the essential communication mechanisms towards the international QIPC community to present the CA and its Virtual Institutes. A set of QUIE2T publications will be accessible via this web site. The CA will also organize a set of thematic conferences on a bi-annual basis, targeting especially young researchers. Finally, a dedicated activity will target mainly industries in the field to ensure a strong interaction and involvement.

Project objectives

The work to accomplish the QUIE^{2}T objectives is organized in a set of five Work-Packages (WPs) aimed at different yet correlated tasks.

WP1 is concerned with the collection and presentation of general information about QIPC related topics. Its main objectives are:

- Collect and disseminate QIPC related relevant data;
- Establish and sustain contacts with other communities;
- Foster links between research, industry, politics and other stake holders.

The kind of data that will be collected and analyzed by this work package is not a fixed entity. One of the major tasks is actually to define and establish a set of topics, whose categorization would be of greatest benefit and interest for the community.

WP2 will provide the community with a widely accepted comprehensive strategic vision and future goals of QIPC research. It will explore possible ways to ensure the future sustainability of the field. These goals will be mainly achieved through the elaboration of a series of documents and tools that will be maintained and regularly updated.

WP3 will increase the general visibility of QIPC related research in Europe, and assure a constant information flow within the community and beyond. This will be achieved specifically via

- The setup of a comprehensive web site
- The setup of adequate means for efficient information exchange and dissemination
- An increase of the general public visibility of QIPC related research

The central piece of work to be delivered by this work package is the project web site, which will serve as the main source of information and focal point to represent the project. Besides its representative function, it will also serve as a major information exchange and communication platform for the community.

The second main objective of this work package is the outreach to other communities, in particular industries, the general public and political representatives. This will be achieved by a sustained public relations campaign, including publications in political and popular media and press releases.
One specific aim is targeted at the sustained awareness of the general public to ensure broader acceptance and understanding of QIPC related issues in particular, and science in general. The collected media contributions will also provide a helpful indicator for the excellence of European research in the context of international competition.

WP4 will bring together excellent scientists at all stages of their careers to advance the frontiers of research. This will be achieved specifically via

- The coordination and organization of scientific meetings;
- Providing stimulation for scientific exchange across sub-fields, generations and disciplines;
- Providing incentives for young researchers.

WP5 ensures the administrative coordination of the project.

PROJECT ACHIEVEMENTS

The following pages provide a detailed description of the progress of the work for each work package during the running time of the project.

Work package 1: Community monitoring and overview

Overview

This work package is tailored to achieve two different but complementary objectives. The first one will be to define and establish a set of topics, whose categorization would be of greatest benefit and interest for the community; according to this preliminary survey the corresponding data will be then collected, analyzed and maintained. The second objective will be to establish and sustain contacts with other RTD communities, and foster links between research, industry, politics and other relevant QIPC stake holders.

Objectives

This work package will be concerned with the collection and presentation of general information about QIPC related topics. Its main objectives are:

- Collect and disseminate QIPC related relevant data;
- Establish and sustain contacts with other communities;
- Foster links between research, industry, politics and other stake holders.

The kind of data that will be collected and analyzed by this work package is not a fixed entity. One of the major tasks is actually to define and establish a set of topics, whose categorization would be of greatest benefit and interest for the community.

Tasks

The work towards these objectives is grouped in three tasks; the corresponding achievements are outlined below. All deliverables of this Work Package are available for public download at

http://qurope.eu/projects/quie2t/wp1/deliverables

Task 1.1 Collect and analyze material for relevant databases

The main work of this work package is to carry out a general work of data mining and analyzing with respect to any information that may be useful, directly or indirectly, to the QIPC community in Europe. This task is concerned with establishing the framework and content of what is actually of interest for the community. In order to ensure maximum community coverage, and enable an unbiased view, a survey will be initiated to collect input from different stake holders.

Once the 'hot' topics have been identified, a general initial concept will be worked out for the procedure of data collection and presentation. This will be carried out in collaboration with WP3, whose responsibility it is to publish and disseminate the final analyzed material vie the project web site.

The main objective of Work Package 1 was to carry out a general work of data mining and analysis with respect to any information that may be useful, directly or indirectly, to the QIPC community in Europe. This task is concerned with establishing the framework and content of what is actually of

interest for the community. In order to ensure maximum community coverage, and enable an unbiased view, a survey was initiated to collect input from different stake holders. This was the subject of Deliverable D1.1.1.

The poll on the QUIE^{2}T public forum[1], which was also broadcast to the QUROPE mailing list[2], has not produced any significant new insights as to new or un-covered material that could be collected in addition to the data we already have available. The community contribution to the services offered on our web site has certainly been significant, such that it can be concluded that the community needs in this area are covered to the satisfaction of all interested parties.

Once the 'hot' topics had been identified, a general initial concept was worked out for the procedure of data collection and presentation. This was carried out in collaboration with WP3, whose responsibility it was to publish and disseminate the final analyzed material via the project web site. The preliminary concept of data collection and presentation was the subject of Deliverables D1.1.2 and D3.2.2; it is described in greater detail in the final report of Deliverable D.1.2.2, together with the final presentation of the data.

Task 1.2 Setup and maintenance of databases

This task consists in initiating a general data collection process, built upon the conclusions reached in T1.1. It will first build upon the cluster of databases that have been established by the QUROPE project and that have already proven their value to the community. These include the job database, collection of events and database of industries. The main idea is to go beyond these 'raw' databases and identify pieces of information that are maybe not useful in a directly obvious way, but could provide some indirect 'return on investment' for the QIPC community. This could include obvious material like related web sites, printed media, events, conferences and fairs, but extend to a collection of media coverage, articles and publications sorted by topic or simply counting hits on specialized web sites. Such data, globally viewed, may well provide some hints on current trends which may prove interesting and useful for researchers, stakeholders, decision makers and journalists alike.

An essential prerequisite for the usefulness of such data is the proper statistical evaluation as well as a well-designed and thought-through presentation. This task will guarantee an adequate view of the collected data by presenting them interactively on the project web site, but also as a final report that will include a detailed analysis and discussion of the results.

The main efforts connected to this task were put into the proper exploitation and visualization of the data collected on the qurope.eu web site. Since the beginning of the project, a dedicated space was reserved on the web portal to make available advanced functionalities, both for browsing and searching the databases, as well as submitting new data.

The view of this data via the public qurope.eu web site, together with the advanced functionalities like searching, filtering and visualization, constitute a virtual QIPC observatory that is able to serve as a tool to highlight the development and advances in the field. The work on these Virtual Observatories has been the subject of Deliverables D2.3.1 and D2.3.2.

[1] http://qurope.eu/content/survey-relevant-databases
[2] http://qurope.eu/content/qurope-mailing-list

The database main entry point is at

http://qurope.eu/db

This page also gives an overview of the latest database entries that is updated dynamically each time an entry is added or modified in the database.

Most data collections can be filtered interactively with respect to some attributes, e.g. news entries[3] can be filtered by date, job entries[4] can be filtered by location, etc. Most of these filters are self-evident; some filters are specific to our infrastructure and are common to many collections. These filters are explained at the corresponding database description of D1.2.2.

Calendar views have been added for all data that support a date attribute (news, events...) and map views for data that support locations (jobs, events...).

Each database presentation page also gives some basic statistics about the number of entries in the collection (subject to the currently active filter selection).

Most data can be exported directly to an Excel style sheet via a button on bottom of the corresponding page.

At the time of this writing, there are the following top-level database topics available:

- News
- Events
- Jobs
- Publications
- Links
- Industries
- Research Groups
- PR Activities
- Projects

These topics and initial database seeds were mainly taken over from the predecessor projects ERA-Pilot QIST and QUROPE and enhanced with some additional items following the public survey among the community members[5]. The newly collected data seeds introduced by QUIE^{2}T are the Publications, Web links, Research groups, PR Activities and Projects.

A detailed description, presentation and analysis including screen shots, is provided in the report of Deliverable D1.2.2.

[3] http://qurope.eu/db/news
[4] http://qurope.eu/db/jobs
[5] http://qurope.eu/content/survey-relevant-databases

Task 1.3 Establish sustainable contacts with industry and policy makers

One of the major successes of the QUROPE project was the initiation and maintenance of an industry database with associated activities of communication and creation of synergies with all kinds of European industries and international companies. The aim of this task is to continue and extend these activities, which have proven a valuable factor of impetus for both the research community as well as various commercial stake holders.

One specific highlight of this task will be the organization of a joint 'industry/policy session' at one of the major QIPC conferences to be organized by WP4. Bringing together representatives from high-level political circles with stake holders from the research community and commercial companies is expected to provide a high level of synergies and cross-fertilization, as has been demonstrated by the precedence of the corresponding activity in the QUROPE project.

The strategic long-term goal of this task is to generally establish and strengthen exchanges and links with interested industries in order to build up a sustainable platform for contacts and cross-fertilization. Specific actions to work towards this goal will be considered after consultation and in collaboration with selected industry representatives.

One of the goals of QUIE^{2}T was to further extend the interaction with industry that had been initiated in the previous EU project QUROPE. The strategic long-term goal of this task is to generally establish and strengthen exchanges and links with interested industries in order to build up a sustainable platform for contacts and cross-fertilisation.

There are two central activities that have been targeted: Industry Sessions at high profile QIPC conferences, and facilitating the exchange of information between the QIPC community and industry, which is reflected in the Industry database. A report on the Industry Session organized at the QIPC'11 conference in Zurich is submitted this reporting period as deliverable D1.3.1, a corresponding report on Industry contacts and the creation of synergies is submitted as deliverable D1.3.2.

There is a long history of QIPC conferences, but in 2007, the QUROPE project[6] initiated an Industry session, consisting of an afternoon of invited talks from Industry speakers, generally covering what they do, why they are interested in the QIPC domain and how they see that impacting on future industry ventures. This was continued in Rome in 2009. The QUIE^{2}T project has continued this effort. In 2011 the QIPC conference was held in Zurich Switzerland. Previous sessions had been focused on quantum communication technologies, primarily as this is already being industrialised and provided a clear link between the work going on in FET projects and what could be commercialised.

Within the QUIE^{2}T project we looked to extend this into the computing and metrology that are also rapidly advancing and garnering both diverse industrial interest as well as interest from national metrology labs – indeed there are several collaborative projects between these national metrology labs that are dedicated to QIPC related activities in both quantum communication and quantum metrology. These initiatives have been driven in part by the client-base of these metrology labs that are seeing increasing demand for the quantification, and even standardisation, of technologies that are operating closer and closer to the quantum regime. A further indication of the increasing importance of quantum metrology was the recent awarding of the Nobel Prize in physics to David J. Wineland, working at NIST (USA) for "ground-breaking experimental methods that enable measuring

[6] http://www.qurope.net/

and manipulation of individual quantum systems." with specific mentions of quantum computing and metrology.

There was also the first attempt to not only have people from industry coming to talk to the QIPC community but also researchers that had taken ideas from the QIPC domain and made the leap in taking these to industry.

The industry database also continues to evolve. Considerable time has been spent trying to improve these contacts. Due to the volatile nature of the industrial domain over recent years many people are rapidly changing positions and employment. This has meant that it is sometimes difficult to maintain a good contact with a company or to ideally improve and consolidate this communication channel. Nonetheless, the total number of industries and people continue to grow. Recently we have started discussions with a new venture fund, Q-Wave, which is specifically targeting investment in quantum technologies. It is early days but they are targeting a $100M fund for these activities, so we will continue to follow this closely.

These industry contacts were pivotal in putting together an industry advisory board for the Flagship proposal that the QIPC community was involved in. This perfectly underlined not only the level of interest in QIPC but also the importance that some of the big industries place on quantum technologies, not only in Europe but also international companies eager to follow the progress in Europe. To give an indication of this, we had organised a provisional Industrial Advisory Board consisting of:

- Gaby Lenhart,
    - *European Telecommunications Standards Institute*
- Alessandro Curioni & Walter Riess,
    - *IBM Research – Zurich (Switzerland)*
- Mark Ritter,
    - *IBM Research – TJ Watson Research Center (US)*
- Grégoire Ribordy,
    - *ID Quantique (Switzerland)*
- Wilfried Verachtert,
    - *Intel Labs Europe, ExaScience – High Performance Computing – imec*
- Leonard P. Hobbs,
    - *Intel Ireland Research (Ireland)*
- Yasuhiro Tokura & William Munro,
    - *NTT – Nipon Telegraph & Telephone Company (Japan)*
- Michael J. Wale,
    - *Oclaro Technology Ltd, (UK)*
- Milos Svoboda,
    - *Siemens AG, Corporate Research and Technologies, Munich, (Germany)*
- Charlotte Rugers,
    - *Siemens IT Solutions and Services in the Netherlands (Netherlands)*

- Thomas Skotnicki,
    - *STMicroelectronics, Crolles (France)*
- Nicholas A. Peters & Thomas Chapuran,
    - *Telcordia Technologies, Applied Research, (USA)*
- Mercedes Soto Rodríguez,
    - *Telefonica, Dept. New Technologies for trust and security, (Spain)*
- Erick Lansard & Thierry Debuisschert,
    - *Thales (France)*
- Andrew Shields,
    - *Toshiba Research, Cambridge Research Laboratory (UK)*

On a more functional level, we have introduced a classification scheme for the Industry database. This classification schemes have been useful in providing an overview of the general interest areas as well as the geographic location of these companies. Further refinement could be made in defining the different interest areas as some are interested in very specific technologies while others appear to be more interested in the general progress of the QIPC domain. This will be left to future initiatives that will hopeful build on this.

In conclusion, the QUIE^{2}T initiatives for developing industry contacts and synergies have been an overwhelming success. The awareness of industry concerning QIPC activities as well as a better understanding for QIPC researchers in how their research can be industrialised has improved markedly. The series of conferences and workshops has gone much further than we initially promised or indeed envisioned with numerous events targeting diverse audiences. The industry database continues to grow and the "quality" of the contacts is improving– we are getting more contacts that have key decision making positions within these industries. The significant increase in the number of QIPC SMEs is also a fantastic sign that this field is growing, expanding its interests and importantly, finding ways to take these future and emerging technologies to the industrial level.

Work Package 2: Strategy, vision and sustainability

Overview

WP2 is designed to maintain and further develop a common European vision, strategy and goals. The objective is on the one hand to provide the community with a widely accepted comprehensive strategic vision and future goals for QIPC research in a broad sense. On the other hand we will take the first steps to ensure the future sustainability of the field. These goals will be achieved through a set of actions (regular updates of the QIPC Strategic Report, preparation of reports, position papers, and strategy/policy documents) and tools that will serve the scope of helping the EC to shape the research program in the field of IST in general and in QIPC in particular. Finally, the organization of working Virtual Institutes Experts in the various sub-fields, their interaction and integration, as well as the constitution of a virtual observatory of the QIPC field will constitute also an important part of WP2 work.

Objectives

The aim of WP2 is twofold. On the one hand, it will provide the community with a widely accepted comprehensive strategic vision and future goals of QIPC research; on the other hand it will explore possible ways to ensure the future sustainability of the field. These goals will be mainly achieved through the elaboration of a series of documents and tools serving the WP different purposes, which will be maintained and regularly updated.

Tasks

The work towards these objectives is grouped in three tasks; the corresponding achievements are outlined below. All deliverables of this Work Package are available for public download at

http://qurope.eu/projects/quie2t/wp2/deliverables

Task 2.1 Virtual Institutes Experts

The first task of this WP will be that of setting up a formal network of experts for each of the four different Virtual Institutes (quantum computation, quantum communication, quantum information sciences and quantum information technologies). The thematic subject of each VI will be split according to the quantum information classification scheme, and VI experts (initially chosen from the contributors to the QIPC Strategic Report, but afterwards expanded by the initial members according to their needs) nominated for each sub-area identified. Satellite meetings of VI experts where the state-of-the-art and goals of QIPC will be reviewed and updated will be planned during the major QUIE2T conferences. Thus, to maximize flexibility, several experts per sub-area will be appointed, so that at least one expert per sub-area will be present during the meetings.

The Virtual Institutes have been set up and can be consulted on-line at http://qurope.eu/vi. Each institute features a Director and an Executive Secretary who run the VI and appoint experts as they need (as was the case, e.g., when updating the QIPC roadmap document – see T2.2). Each VI has its own list of affiliated groups, dedicated events, news etc.

Considerable use of Virtual Institute expertise and the established infrastructure was made during the running time of the project, including, but not limited to

- the active participation in the preparation of the EPS FARQUEST project,

- the preparation and overview of the first QUIE2T international QIPC conference in Zurich, Sep 2011, and the second QUIE2T international QIPC conference in Florence, July 2013,
- the drafting of a Green Paper of the European Commission in preparation of the Common Strategic Framework for EU Research and Innovation Funding COM (2011) 48,
- the overview and organization of the two QIPC Young Investigator Awards in 2011 and 2013.

Task 2.2 QIPC Strategic Report, Quantum Information Classification Scheme and position documents

The main purpose of this task is to periodically update the QIPC Strategic Report (expressing the common strategy, vision and goals of the QIPC community) and the Quantum Information Classification Scheme (an indexed list of all sub-topics within the field of QIPC). These updates will be based both on the VI experts judgment of the state-of-the-art and recent advances in the field, as well as on direct community input provided via the web portal set up in WP3. Given the long-term strategy nature of these documents there will be only two updates following the two major conferences organized by the CA (and therefore the VI expert meeting).

In addition, this task will prepare all position documents needed to promote the QIPC field during the preparation of the Commission Work-Program 2011-13, in particular the one concerning the proposals to ensure the future sustainability of the field (see task 2.4 below).

The update of the QIPC roadmap document (currently at v. 1.8) and the QICS classification scheme (currently at v. 1.3) has happened according to the QUIE^{2}T original schedule and has been delivered as deliverable D2.2.2 (QIPC Strategic Report and Quantum Information Classification Scheme updates) where detailed information about the changes done can be found.

The current version of the Roadmap can be browsed on-line at http://qurope.eu/content/Roadmap, older updates can be downloaded in pdf format at the QUROPE website: http://qurope.eu/content/qipc-roadmap/old.

The current version of the QICS can be browsed on-line at http://qurope.eu/content/qics-book . Previous versions can be found at http://qurope.eu/content/qics/old/ .

Task 2.3 QIPC Virtual Observatory

The data collected by the previous QIPC CAs, will be maintained and complemented by QUIE2T, most notably by WP1 (and partly, through the previous task). Unquestionably, these data represent a valuable asset for the QIPC community that can be further exploited through the application of appropriate visualization tools (such e.g., tables, Google maps mash-up, graphs or trees) which could be used, e.g., to highlight the development and advances of the field.

Take for example the quantum information classification scheme. By classifying the scientific papers according to it, one can single out, e.g., the more active areas in the past years, unveil past and future trends, and the time evolution during the analyzed period (for example one can study the correlation between the scientific production in Europe and worldwide and the content of the different FET Proactive calls).

As a first step, we plan to analyze along these lines the worldwide QIPC scientific publication from 2004 to 2006, for which existing databases (built up when first developing the quantum information classification scheme) can be exploited; this will allow to fine tune the visualization tools and to get a feeling of how interesting our procedure can be. Starting from this

initial seed, we will explore in which directions our analysis and tools (which will be made public via the CA web portal) can be further developed and made more comprehensive (e.g., we could address the scientific production of leading European institutions in the field during the years).

The purpose of this task was to further exploit the invaluable asset represented by the plethora of different QIPC-related data collected by the previous CAs in the field – most notably the QUIE^{2}T predecessors ERA-Pilot QIST and QUROPE –, and reorganized as well as updated by WP1.

During the project first year two objectives were reached:

1. The application of appropriate visualization tools for particular data sets has been reached (see, e.g., the integration of Google maps showing the location of the groups appearing in the Research Groups database, implemented in collaboration with WP1 and WP3);
2. The delineation of bibliometric indicators for the QIPC field as a case study in the final report of the "Impact of FET Research Initiatives" (IFETRI) commissioned by the EC to the German VDI Technologiezentrum (project number SMART 2009/0052); the analysis is available at http://studies.cwts.nl/projects/ifetri/.

However doubts where raised from many community members about the accuracy of the IFETRI bibliometric analysis (some of the most cited people are not faithfully represented in the analysis), and in general on the usefulness and validity of bibliometric analysis tools. Given these problems and the need to divert as many resources as possible to task 2.4, we did not continue this activity.

Instead, the main efforts connected to this task were put into the proper exploitation and visualization of the data collected on the `qurope.eu` web site. Since the beginning of the project, a dedicated space was reserved on the web portal to make available advanced functionalities, both for browsing and searching the databases, as well as submitting new data.

The view of this data via the public qurope.eu web site, together with the advanced functionalities like searching, filtering, statistical analysis and visualization, constitute a virtual QIPC observatory that is able to serve as a tool to highlight the development and advances in the field.

A detailed description of the functionality and tools available is provided in the report of Deliverable D2.3.2.

Task 2.4 Towards sustainability in QIPC

QIPC is clearly entering in the second stage of its evolution, turning from an embryonic high-risk research field, into a more mature medium-risk field that has reached critical mass and already delivered several technological applications (e.g., quantum key distribution systems, random numbers generators, etc.). Measures to ensure the future sustainability of the entire field are urgent and the different options need to be fully explored. One of the possibilities at stake (as explicitly mentioned in the call for this objective), is to gather sufficient commitment from the different QIPC actors to set up an ERA-NET+ action in the field, leading possibly in the long-term to a co-decision for an Article 169 Initiative.

The aim of this task is therefore to us the QUIE2T consortium members' network in order to reach high-profile policy makers of key European Member States and gauge their interest for an ERA-NET+ action in QIPC. In a second phase, if and once a critical mass of different member states is achieved it will ask letters of intent to participate to the ERA-NET+ action. A white paper will be then drafted and submitted to the Commission as input for the preparation of the Work Programme 2011-13.

Collaboration and coordination with other similar initiatives in the field (such as ERA-NET initiatives eventually applying in this or the next two calls) will be sought for and maximized.

This task has been always at the core of the QUIE^{2}T activity in general, and the FBK-ECT* and UULM partners in particular (actually it is the one that has been drawing most of our resources both in terms of man power as well as brainstorming).

During the last year of the coordination action the work carried out under this task has been concentrated around three main activities:

Providing feedback to the public consultation launched by the FET unit to identify promising and potentially game-changing directions for future technological research (a trimmed version of this document is also visible on-line at http://cordis.europa.eu/fp7/ict/fet-proactive/fetconsult2012-results2_en.html?rid=125);

Developing the concept of a new FET instrument (Proactive Cluster);

Supporting the European Commission's Joint Research Centre in the concept, planning and organization of the meeting "Scientific Support to Policy Making: New Applications of Quantum Technologies for Computing, Communication, Metrology and Sensing" to be held in Brussels on 7 March 2013.

The text of the documents is reported in the Appendices of this report, where one can also find the agenda of the JRC meeting. All these documents should be regarded as an integral part of QUIE^{2}T Milestone 5, being also natural to see them as a fulfillment of the QUIE^{2}T mission.

Work Package 3: Dissemination activities

Overview

The central piece of work to be delivered by this work package is the QUIE2T web portal, which will serve as the main source of information and focal point to represent the project. Besides its representative function, it will also serve as a major information exchange and communication platform for the community.

As second objective, WP3 aims at increasing the impact on the society via improved public visibility and awareness of the field, through specific initiatives such as articles in specialized/popular science/general press, promotion, a dedicated documentary movie (whose production was initiated by the QUIE2T predecessor QUROPE), etc. It will collect and provide material for the public part of the project web site. It will also regularly produce specific publications to reflect and promote QIPC research in Europe, possibly in cooperation with the funded FP7 Integrated Projects and the EC (through the FET QIPC Proactive Initiative). As another objective WP3 will stimulate and facilitate discussions on QIPC related topics, in particular among, but not restricted to, young scientists, students and the interested general public. The idea is to provide a forum where specific topics and questions may be raised and discussed. This objective will be pursued in close cooperation with WP2 and WP4.

Objectives

The aim of this work package is to increase the general visibility of QIPC related research in Europe, and to assure a constant information flow within the community and beyond. This will be achieved specifically via

- The setup of a comprehensive web site
- The setup of adequate means for efficient information exchange and dissemination
- An increase of the general public visibility of QIPC related research

The central piece of work to be delivered by this work package is the project web site, which will serve as the main source of information and focal point to represent the project. Besides its representative function, it will also serve as a major information exchange and communication platform for the community.

The second main objective of this work package is the outreach to other communities, in particular industries, the general public and political representatives. This will be achieved by a sustained public relations campaign, including publications in political and popular media and press releases. One specific aim is targeted at the sustained awareness of the general public to ensure broader acceptance and understanding of QIPC related issues in particular, and science in general. The collected media contributions will also provide a helpful indicator for the excellence of European research in the context of international competition.

Tasks

The work towards these objectives is grouped in six tasks; the corresponding achievements are outlined below. All deliverables of this Work Package are available for public download at

http://qurope.eu/projects/quie2t/wp3/deliverables

T3.1 Setup an information exchange platform

Work on this task will commence immediately with the project start and run for the first three months. The aim is to define the exact procedure that is to be followed in order to achieve the objective of efficient information exchange and dissemination. This will include a concept for the web site that defines the features that are to be implemented to facilitate the interaction and data collection. It will also define a strategy for public relations and media outreach and formulate eventual additional specific tasks that could aid in the pursuit of the work package objectives.

The result of this task should be reached after extensive consultation of the project members and the whole community. A dedicated space will be reserved on the project web site to collect input on this topic. This feedback channel will remain open for the remaining duration of the project, even after this task has completed, in order to monitor the needs and wishes of the community. It should be stressed that the conclusions reached through this task will only serve as a starting point and are open to be adapted during the course of the project, in case that new needs or ideas arise.

Work on this task has started already before the beginning of the project, an operational web site was in place on day one of the project. The information exchange platform is entirely web based and can be administered remotely by any authorized administrator. The main „out" channel to distribute information to the QIPC community is the QUROPE mailing list[7]. This list is populated with addresses of all registered users of the QUROPE site, any registered user is automatically subscribed to the list.
To receive information there are several possible channels, the most convenient way, apart from joining the QUROPE mailing list, is to subscribe to one or several of the news feeds that are offered at the bottom of many relevant pages (eg for news[8] or jobs[9] announcements). Subscribing to any of the available news feeds will lead to an automatic notification for any update (addition or change) of the corresponding database. The use of the news feeds has been documented in the Frequently Asked Questions[10].
For internal discussions and confidential dissemination, some restricted discussion forums exist within certain groups. This concerns in particular any projects that are hosted at the QUROPE site, which have their own intranet area that is accessible only to project members.

A detailed description of the information exchange concept is given in the report on Deliverable D3.1.1, available for download at http://qurope.eu/projects/quie2t/wp3/deliverables .

[7] http://qurope.eu/qurope-mailing-list
[8] http://qurope.eu/db/news
[9] http://qurope.eu/db/jobs
[10] http://qurope.eu/faq

T3.2 Development and maintenance of a comprehensive web portal

This is the main task of this work package as the web site will be one of the keystones for the operation of the project. Its general aim is to present all the data collected by the project in a visually appealing and easy-to-grasp way. This task will run for the whole lifetime of the project, as the web site is continually updated, with new tools and features to be added as a response to suggested or perceived community needs. The web site will allow for efficient maintenance such that information can be added and managed in a very flexible way.

The minimal features that the web site will provide are:

- *News section with information items to be updated on a continuous basis and on-demand for specific events and news;*
- *Mission statement of the project and listing of planned activities;*
- *Access to existing databases;*
- *Reports and related information (presentations, abstracts, papers) on activities and on progress made towards the project objectives;*
- *Press releases and publications;*
- *Subscription tools and login area for potential users;*
- *Easy to use interface;*
- *Search function;*
- *Forum function;*
- *Content management tool(s) for databases, project results and documents.*

The web site will be registered under the .eu domain (tentative domain name: www.quie2t.eu).

Work on a web site has started already before the beginning of the project, and an operational web site was in place on the start day of QUIE^{2}T. It was decided early on to use a web-based Content Management System (CMS) that would allow administrative tasks to be carried out remotely by any authorized administrator. Several CMSs were evaluated before finally selecting Drupal[11] as the tool of choice. Drupal can be used to build everything from personal blogs to enterprise applications. Thousands of add-on modules and designs are available and currently it is the CMS with the largest user and developer base.

The information exchange platform is entirely web based and can be administered remotely by any authorized administrator. The main „out“ channel to distribute information to the QIPC community is the QUROPE mailing list, any registered user is automatically subscribed to the list. In the first year, about 48 messages have been distributed via that channel, i.e. almost one per week.

To receive information there are several possible channels, the most convenient way, apart from subscribing to the QUROPE mailing list, is to subscribe to one or several of the news feeds that are offered at the bottom of many relevant pages (eg for news or jobs announcements).

[11] http://drupal.org/

The hosting has been offered by the Niels-Bohr Institute[12] in Copenhagen, who agreed to continue the service following the successful hosting of the predecessor project QUROPE.

The main domain for the QUIE^{2}T web site has been deliberately chosen to be

http://qurope.eu/

It is supposed to be an umbrella domain for several QIPC related subjects and projects.

A detailed description of the web site is given in the report on Deliverable D3.2.1, available for download from http://qurope.eu/projects/quie2t/wp3/deliverables .

T3.3 Maintenance and update of existing QUROPE databases

This task will run for a limited period of 6 months right from the start of the project. It is designed to incorporate and integrate all the information that has been collected and processed by the QUROPE project during its lifetime. It will ensure that no relevant data will be lost and enable a long-term view and evaluation of possible evolutions of pieces of information. It will also be valuable in evaluating eventual emerging trends by providing a larger basis for statistical data evaluation.

During the first year, an infrastructure has been set up to collect relevant data and to present it at the project web site. All the existing databases that were established by the predecessor project QUROPE[13] have been ported to the QUIE^{2}T web site, this includes in particular

- the industry database[14],
- the collection of research groups[15],
- contact details[16] (email addresses are only accessible to authorized users).

The databases that are only relevant for current or future events (news[17], events[18], jobs[19]) have not been populated with old data as they are of no interest anymore. These databases have been started from scratch with the beginning of the project.

All databases are continuously monitored and relevant additions are disseminated via the QUROPE mailing list.

The complete database collection is available at

http://qurope.eu/db

[12] http://www.nbi.ku.dk/
[13] http://www.qurope.net/
[14] http://qurope.eu/db/industries
[15] http://qurope.eu/db/groups
[16] http://qurope.eu/db/group_contacts
[17] http://qurope.eu/db/news
[18] http://qurope.eu/db/events
[19] http://qurope.eu/db/jobs

T3.4 Information and promotion material

This task will take care of a proper presentation and visibility of the project and the QIPC community as a whole to the outside world. This will be achieved via focused PR activities, including press releases, project flyers and publication of dedicated articles. A special emphasis will be put on the presence of QIPC related articles in high-profile political magazines, in order to increase the visibility of the community to decision makers and other stake holders in the field.

The overall functionality of the Flyer is to give general information on the project to the European QIPC community and beyond. The Flyer will be regularly updated with information that has been derived from the project. It will be disseminated at international scientific Conferences and Fairs and be made available to the general public as download document through the project website.

A final issue this is going to be concerned with activities for the promotion of the QIPC documentary movie that has been initiated by the QUROPE project. Due to initial difficulties in ensuring the total financing of the movie, its production was significantly delayed and the movie could not be finished during the life time of QUROPE. It is expected that the movie will be finished at the projects mid-term, at which point this work package will contribute in disseminating information and promotional material to achieve a maximal possible impact factor of this documentary.

As part of the WP3 activities we have presented an exhibit at the ICT 2010[20] conference in Brussels, 27 – 29 September 2010. The event was very well-attended both by specialists and non-specialists including well-known media people. The QUIE^{2}T exhibit[21] presented some exciting ideas and innovations at the forefront of QIPC research to demonstrate that European researchers are aiming to capitalise on recent developments in small-scale applications involving a few quantum particles. Visitors were able to discover what the term 'quantum' actually means, and its implications for ICT. As an example of a first commercial application of QIPC, a true random number generator for applications such as information security, gaming, lotteries, and scientific research, was demonstrated through a 'quantum roulette' game, in which visitors had the chance to win small prizes. As QUIE^{2}T representatives, K. Pruvost and D. Binosi were present at the exhibition.

QUIE^{2}T was represented at the Commission's ***f*et11** conference taking place from 4 to 6 of May in Budapest[22]. An exhibit proposal that was submitted in response to a European Commissions call has been successfully evaluated and was among the 28 exhibition stands present at the conference. According to the commission, "***fet11** is a unique conference on visionary, high-risk and long-term research in information science and technology. Featuring an exceptionally broad range of scientific fields the event will seed new ideas across disciplines that will reshape the future*".

In the same spirit as the Brussels exhibit one year before, the exhibit at ***f*et11** brought some of the research highlights of the consortia to specialist and to non-specialist audiences in an interactive manner. The aim was to show the trans-formative potential of the fundamental research. At the same time we could attract the interest of young researchers motivating them to take on the challenges of cutting edge technological research. The presentations were interactive with minimal textual content, using videos as well as demonstrations that would give the audiences an opportunity for hands on experience of some complicated technology experiments. Such the progress in different strands of QIFT activities in Europe was demonstrated.

In addition, a project flyer that served as a press release was distributed at the conference, see

[20] http://ec.europa.eu/information_society/events/ict/2010/index_en.htm
[21] http://ec.europa.eu/information_society/events/cf/ict2010/item-display.cfm?id=2988
[22] http://www.fet11.eu/

Figure 1.

Oxford as WP3 leader has created some video clips based on key scientific highlights that were launched on the web during this reporting period. The research ideas and results in these films reflect the FET ideas of the commission. The videos are publicly available on YouTube:

http://www.youtube.com/user/TheQubitLab/videos/

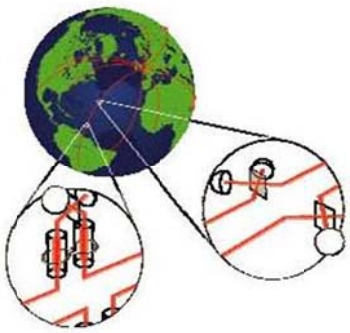
QUIE^{2}T is also in constant contact with the producers of the documentary movie that was initiated by the predecessor program QUROPE, with the aim to input on current status of the science and explore venues of improvement. The production company that was in charge of the movie had experienced substantial difficulties during the financial crisis of the last two years and was forced into bankruptcy in Feb. 2011. However, all obligations, liabilities and contracts were transferred to a new production company, with the same person in charge, so that the project schedule has not been changed (in contrast to the working title that is now 'Taming the Quantum World'). The currently expected release date is November 2013.

However, another teaser trailer has been produced (after the one that was presented at the QUROPE conference in Rome), and is available (though password protected) at http://vimeo.com/28151262/. It is used as a promotional item to further gain interest by potential funding partners.

Progress in Quantum Information Foundations and Technologies in Europe

Kamna Pruvost, Joshua Nunn

The European Coordination Action QUIE2T, supports research into Quantum Information Foundations and Technologies. We'll be at the ***f*et11** event in Budapest (http://www.fet11.eu/) showcasing our medium and long-term research in superfast quantum computing and ultra-secure quantum communications, including:



Quantum networks could span the globe providing ultrasecure telecoms

- Ion Trap Quantum Processors

The traps store individual ionised and laser-cooled quantum atoms which are used as quantum bits. We'll present three traps developed at Oxford using semiconductor micro-fabrication technology. There'll also be a rotating model of a single ion trap from Ulm University where people can start playing and experimenting with this hands-on device.

- Quantum memory

Oxford is developing a *quantum memory* which can store photons and then release them, a crucial technology for quantum computing with light. Our memory is very simple, consisting of a room-temperature glass cell filled with cesium vapour, and a laser. You'll be able to see the cell at the exhibit, and we'll explain how we stored short pulses of light just a fraction of a nanosecond long.

- Diamond qubits

We all know diamond is an amazing material; it's even perfect for quantum computing! Qubits embedded in diamond are protected from noise, allowing operation in ambient conditions. These qubits are also the world's smallest magnetic sensors. Along with the University of Stuttgart we will showcase a millimetre-sized device with millions of these tiny sensors.

- QKD

We'll showcase the latest developments in *quantum key distribution* – which allows guaranteed-secure quantum communication – from Swiss firm IDQUANTIQ, including a demonstration of six encrypted links at Siemens in the Netherlands.

- Quantum random number generators

These devices exploit the fundamental randomness of quantum physics to output random numbers for cryptography, gaming and research. A "Quantum Roulette" will allow visitors to play to win prizes!

Figure 1 Project flyer presented at ***f***et11.

T3.5 Traveling professor 'Quantum Envoy'

This task will be concerned with a rather concrete kind of dissemination activity. The idea is to organize and support a 'traveling professor', i.e. a prominent scientist who, during a limited period of time, travels to various locations throughout Europe, and presents general aspects of QIPC in public lectures or presentations. The targeted audience for these lectures is the general public and interested newcomers, e.g. university and high school students. A special attention will be given at the destinations of this Quantum Envoy. On the one hand on should target prominent locations so as to ensure a maximum target audience, on the other hand destinations should also be uniformly distributed across Europe without any bias towards any particular region.

In practice it is planned to organize a lecture tour of about one week for one prominent scientist for each year of the project duration, to visit about 3-4 locations per tour. Travel costs and logistic support will be provided by QUIE2T, other expenses like lodging etc. are expected to be taken over by local organizations. The budget for the Quantum Envoy activities will rest with the coordinator, so the payments can be forwarded directly to the Envoy without administrative overhead.

The QUIE^{2}T 'Quantum Envoy' task is concerned with a rather concrete kind of dissemination activity. The idea is to organize and support a travelling professor, i.e. a prominent scientist who, during a limited period of time, travels to various locations throughout Europe, and presents general aspects of QIPC in public lectures or presentations. The targeted audience for these lectures is the general public and interested newcomers, e.g. university and high school students.

A call for applications for a quantum Envoy support has been published on the QUIE^{2}T web site at

http://qurope.eu/quie2t/calls/quantum-envoy

where also a web form is available for direct on-line applications.

The call has been broadcast several times to the QUROPE mailing list, however, in the course of a three-year project, only two applications were received.

In the second half of 2010, there were concrete talks and email exchanges on two occasions: one for a public lecture tour in Europe by Hans Bachor, the other for a public lecture of Ignacio Cirac in Vienna. On both occasions, sufficient funds were available from original sources so no support from QUIE^{2}T was needed.

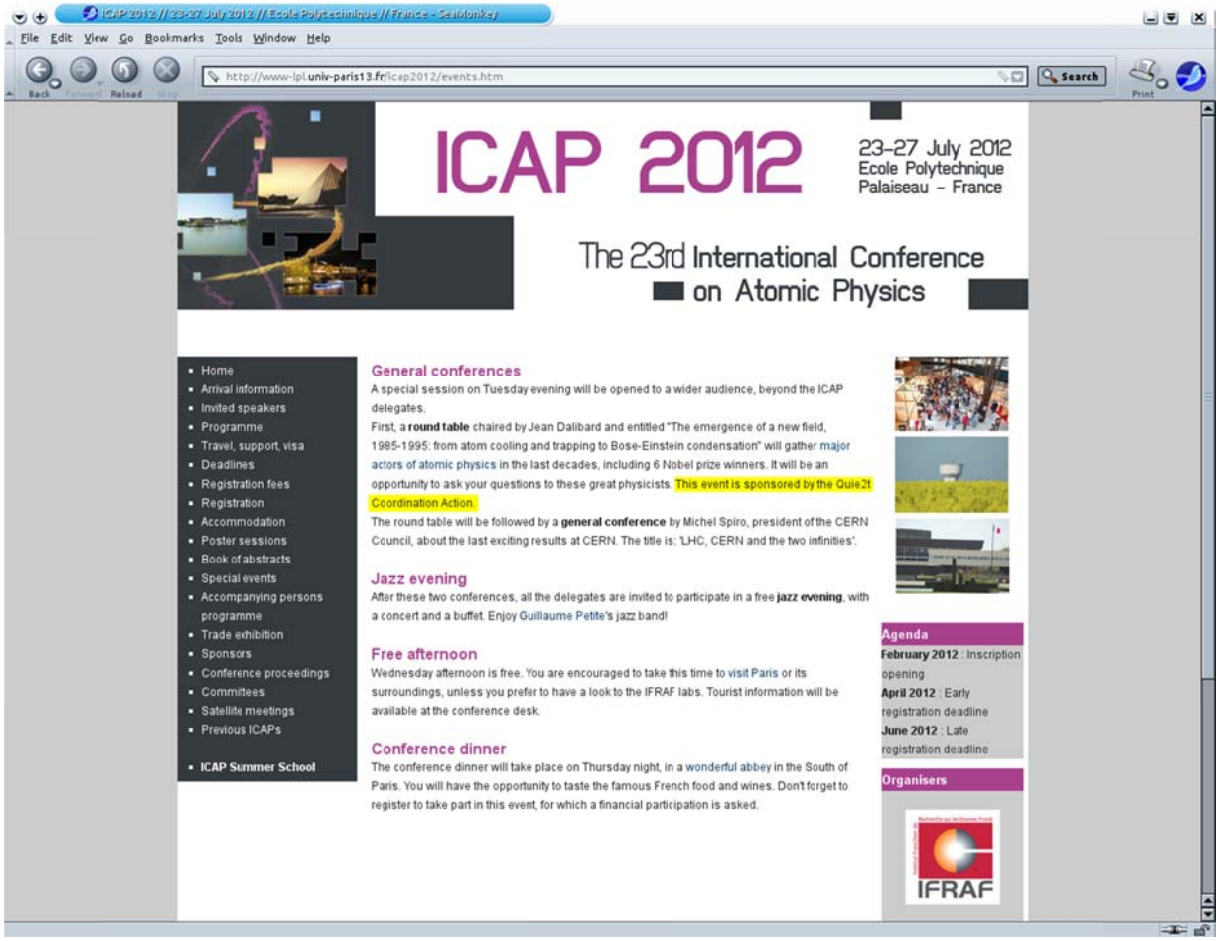
The lesson we learned from these exchanges is that one needs not only a speaker and a program, but also an infrastructure to publicise the event to a broad target audience. One possibility that seems most promising in this regard is to organize some public lectures during our own big QIPC conference, which already happened once with a very successful public evening at the QIPC07 conference in Barcelona. The possibility was discussed for the QIPC conference in Zurich but did not materialize because of schedule constraints. It will be pushed again for the agenda of the QIPC 2013 conference in Florence[23], to be organized this year.

[23] http://www.cqstar.eu/QIPC/index.html

The only application that was received in the first year of QUIE^{2}T came from Profs. M. Leduc, H. Perrin and P. Grangier who were organizing the 23rd International Conference on Atomic Physics (ICAP 2012), held at Ecole Polytechnique in Palaiseau, France from July 23rd to 27th, 2012. A web site is available at http://www-lpl.univ-paris13.fr/ICAP2012/.

On this occasion, it was decided to organize a round table between four Nobel Prize winners who were present at the conference: Bill Phillips (NIST, USA), Claude Cohen-Tannoudji (ENS Paris), Wolfgang Ketterle (MIT, USA), and Roy Glauber (Harvard, USA). Professor Dan Kleppner (MIT, USA) also participated to the Round Table, animated by Jean Dalibard (ENS, Paris). The general theme was the birth of cold atoms physics, in which all participants have played a major role.

Given the major role of atoms and ions cooling and trapping in the current developments of Quantum Information Science, and also of the major role of quantum optics, founded by Roy Glauber, for Quantum Communications, QUIE^{2}T was asked for a support of 6000 Euros, devoted to the organization of the Round Table.



The support of QUIE^{2}T was acknowledged on the program and during the event, and QUIE^{2}T was included in the official list of sponsors. Quantum Information Science was strongly represented at the Conference, both in the Program Committee and the sessions on Quantum Information and Quantum Simulations.

The Round Table was part of a special evening on Tuesday July 24th that was open to attendance by people not registered at the conference, in line with the QUIE^{2}T objective of broad dissemination.

A slide show of the complete round table discussion is available at the conference web site:

http://www-lpl.univ-paris13.fr/icap2012/roundtable.htm.

A second application came from Profs. Gershin Kurizki and Daniel Esteve for the workshop:

QUO VADIS, QUANTUM HYBRIDIUM?

(IN MEMORIAM ANTONIO BARONE)

October 24-26, 2012, Ischia, Italy

The demanded support was initially for a public talk delivered by M. Lukin from Harvard University. Due to a last-minute unavailability of M. Lukin, he was replaced by his collaborator Prof. J. Taylor of UMD / NIST. He gave the same public talk that was scheduled for M. Lukin with the topic

‚*Exploring new frontiers of quantum science with hybrid systems* '.

In summary, in order to evaluate the success of the ‚Quantum Envoy' program and idea as a whole, it appears that one would need to take a more pro-active approach to make it work. Instead of waiving with the funds and waiting for applications, it seems more promising to approach concretely some candidates with a specific program and schedule. However, this would need more careful and long-term preparation, as well as a certain willingness of the people involved, which in view of the busy agendas of the most prominent scientists, seems to be the major obstacle.

A more extensive description of the Quantum Envoy events is provided in the report on Deliverable D3.5.3, available for download at http://qurope.eu/projects/quie2t/wp3/deliverables .

T3.6 Scientific Exchange and Learning Center

The aim of this task is to stimulate and facilitate discussions on QIPC related topics, in particular among, but not restricted to, young scientists, students and the interested general public. The idea is to provide a forum where specific topics and questions may be raised and discussed.

Another task is to collect and evaluate material in order to setup a database with introductory texts and resources, like books, reviews, lecture notes etc. The entries in this database may be reviewed and discussed in the forum, with a rating system that might facilitate the choice for non-specialists.

A preliminary infrastructure for an interactive learning center has been set up at the QUIE^{2}T web site:

http://qurope.eu/qipc/

with a collection of on-line background and learning material at

http://qurope.eu/qipc/basics/.

However, it is currently still lacking significant content, even though the procedure is straightforward and the threshold for participating is low. Currently it contains a small collection of web links and movies. Some content harvesting has been planned with the Quantiki web site[24], were similar efforts were put into place.

[24] http://www.quantiki.org/

Work Package 4: Synergy for QIPC science

Overview

The aim of this Work-Package is to assist in the coordination and support of cross-disciplinary scientific meetings and other dissemination activities in QIPC in Europe, increasing their scope, impact and overall quality.

In particular it will: provide international forums for exchange of scientific results; assist in the identification and recruitment of key international speakers for the major conferences; help in formulating common themes across different disciplines involved in QIPC: assist cross-fertilization of concepts and technologies across different subfields of QIPC; build a pan-European QIPC research community; participate in the organization of the QIPC cluster review meetings, increase the industrial liaison by encouraging the organization of invited lecturers from companies and firms to the meetings (in support of WP1); increase the participation of new countries by attracting young people from those countries to the meetings (through, e.g., the QUIE2T web site or other dissemination activities set up by WP3).

Objectives

The aim of this work package is to bring together excellent scientists at all stages of their careers to advance the frontiers of research. This will be achieved specifically via

- The coordination and organization of scientific meetings;
- Providing stimulation for scientific exchange across sub-fields, generations and disciplines;
- Providing incentives for young researchers.

Tasks

The work towards these objectives is grouped in two tasks; the corresponding achievements are outlined below. All deliverables of this Work Package are available for public download at

http://qurope.eu/projects/quie2t/wp4/deliverables

T4.1 Organization and support of International Conferences and Meetings

The aim of this task is to coordinate and support cross-disciplinary scientific meetings for the QIPC community in Europe. In particular it will continue the highly successful series of conferences that were organized by the predecessor program QUROPE, and therefore assure a continuous coverage of major QIPC events in Europe every two years.

The international QIPC conferences have a more than ten year tradition by now, and it is clear already that they are essential for the future development of the field. They are generally considered to be the yearly key event of the QIPC community and this status will be maintained in the future.

Support for the organization of the conferences will include

- *A timely call for proposals to be published on the project web site;*
- *The evaluation of received proposals;*
- *Logistic support for the local organizers during the preparation of the event;*
- *Collection of general overview material on the event and assembly of a report.*

The call for proposals will be published on the CA web site no later than month 3 of the project. In order to ensure a fair and object evaluation of the received proposals, the leader of WP4, together with the Project Coordinator, will first pre-evaluate the received proposals for formal correctness and then forward all eligible proposals to the Advisory Board of Experts (ABE). The ABE's recommendation has to be approved by the QUIE2T Steering Committee by a simple majority vote. In case no majority can be reached, the vote of the Project Coordinator will be decisive.

The allocated budget for each conference is fixed at 65kEUR. It is expected that a major portion of the total conference budget will be covered by other sources. The QUIE2T contribution will be used to guarantee the interdisciplinary and independent character of the meeting and ensure the highest possible quality standards. In particular, it will be used to support the following:

- *25kEUR for invited speakers and organizers*
- *22kEUR for the venue*
- *18kEUR for local support of the organizers*

These amounts are based on the experiences collected during the organization of similar conferences by the predecessor CA QUROPE. The budget for invited speakers will be used in particular not only for scientific speakers, but also for the invitation of special participants from industry and politics, to ensure the success of the conference as a meeting place across disciplines. Similarly, the budget for the venue includes support for special activities like dissemination and promotion, organization of public lectures during the conference, video-recording of lectures, etc. These activities will also contribute to ensure a long-term effect of the conference, by disseminating any recorded material via the project web site.

For reasons of administrative effectiveness, the budget for the support of conferences will rest with the coordinator who will thus be able to directly forward the money to the local organizers of the conference, thereby avoiding any unnecessary administrative overhead and possible delays.

In 2011, one of the two big international conferences initiated by QUIE^{2}T was organized. WP 4's responsibilities in terms of the tasks related to the organization of scientific meetings were:

a) To publish a call for proposals on the project web site and to broadcast it to the community;
b) To evaluate the received proposals;
c) To provide logistic support for the local organizers during the preparation of the event;
d) To collect the material for the event and draft a report.

Points a) and b) were already completed during reporting period 1, the QIPC 2011 Conference[25] was held at ETH Zürich from September 5 - 9, 2011. The conference program included 32 invited talks, 70 contributed talks and more than 100 poster presentations covering a broad range of topics.

Regarding point c), the QUIE^{2}T coordinator and the WP4 work package leader held constant contact with the local organizers to ensure the conference would meet the expectations and high standards of the previous meetings. In particular, the Advisory Board of Experts and the Virtual Institute directors were consulted for input to the conference program, invited speakers and session topics, so as to guarantee the widest possible scope and coverage of scientific fields.

For point d), a preliminary report was assembled right after the conference that was used by the local organizers as a basis for their final report on the event. This report is available at the QUIE^{2}T web site[26], while the final report, including a detailed budget overview, is attached to this document.

Apart from the scientific program, some extra-scientific events were organized, specifically under the auspices of QUIE^{2}T:

- **Industry Session**
  After the successful Industry Sessions held at the previous QIPC meetings in Barcelona'07 and Rome'09, this event again offered a platform for exchanges between academic researchers and industry leaders. The session was opened by QUIE^{2}T work package leader Tommaso Calarco, who briefly explained the aim and the history of the activity, and hosted by QUIE^{2}T work package leader Nicolas Gisin, who further explained the new format of having representatives from industry and academic research in the session.

  This year, there were presentations by Dr. Bruno Michel**,** from IBM Research, Zürich, Dr. Grégoire Ribordy, CEO of ID Quantique, Dr. Jürgen Appel from the Niels Bohr Institute in Copenhagen, and Dr. Bruno Sanguinetti from the Group of Applied Physics in Geneva. The event was well attended and sparked a number of interesting questions and lively discussions. At the end IBM announced they will organize a workshop in 2012 with invited scientists and EU representatives to assess the potential of quantum technologies (contact Dr. Walter Riess, IBM Rüschlikon).

  ID Quantique had a stand at the conference, showcasing some of their commercial products, like for instance QUANTIS (a true random-number generator) and CLAVIS2 (a QKD research platform).

- **QIPC Young Investigator Award ceremony**
  This is described in Task 4.2 just below.

[25] http://www.qipc2011.ethz.ch/
[26] http://qurope.eu/content/qipc-2011-conference-report/

- **EU funding note**
  The EU funding session was covered by two distinct events: the first was held on Wednesday morning, with key speakers Werner Steinhögl from the European Commission, and Dirk Holste from the ESF project FARQUEST. A complementary second session was held on Wednesday after lunch, which provided opportunity for more specific questions.

  The morning session included talks by W. Steinhögl on 'QI *Science & Technology in the European FET programme' and* Dirk Holste who presented the 'ESF *Forward Look FARQUEST'.* The lunch session started with a contribution by Ales Fiala, the FET Open Head of Unit, on 'Quantum *Information science in the Open scheme of FET'.* This was followed by a more detailed outline by W. Steinhögl on the upcoming calls and funding opportunities. Both sessions were well attended and raised a number of questions and remarks by interested participants.

- **Rump session**
  For the first time in the series, QIPC 2011 featured a so-called 'Rump Session'. In this informal session participants gave short presentations on recent results, work in progress, and other topics of interest to the QIPC community. The open microphone session stimulated a discussion of the future of quantum information processing and communication.

  The session was open to all participants of the conference and guests. The event was a great success with contributions on a variety of different topics that incited some heated discussions.

In summary, the QIPC 2011 conference in Zürich continued the highly successful series of conferences that were initiated by the FP6 Coordination Action program QUROPE, and therefore assured a continuous coverage of major QIPC events in Europe every two years. The international QIPC are generally considered to be the yearly key event of the QIPC community in Europe and this status was clearly upheld by this year's conference in Zürich. The community presented itself in a very vigorous and scientifically proliferate state. The number of participants has increased compared to the earlier events with 14 prominent overseas speakers who accepted the invitation to come to Zürich. The number of attendees, the wide variety of topics and activities, as well as a high proportion of young researchers among the participants testifies to the fact that QIPC research in Europe is well on par and highly competitive with comparable activities elsewhere in the world.

The

International Conference on Quantum Information Processing and Communication QIPC 2013

was held at the University of Florence from June 30 to July 5, 2013. The Conference program included 30 invited talks, 55 contributed talks and more than 90 poster presentations covering a broad range of topics on quantum information and quantum communication, physical realizations of quantum systems for information technologies and topical subjects such as quantum enhanced measurements, foundations of quantum information, quantum simulations and many-body systems.

In an industry sessions with three invited speakers, insights into the commercial developments of current and future quantum were given. Funding opportunities and future strategies were presented in a funding session featuring national and EU funding experts. A special session open to the public provided an insight on how to disseminate Quantum Information Science and Technology to a general audience.

The conference brought together scientists from 28 different countries. More than 120 different universities and institutes and funding agencies such as the European Commission were represented.

The conference was hosted by the University of Florence and supported by the EU Coordination Action QUIE2T (Quantum Information Entanglement-Enabled Technologies), the CNR-INO institute of Florence, the EU Projects Q-ESSENCE, SIQS and SOLID.

More detailed information about the Conference is available on the website:

http://www.cqstar.eu/QIPC/

In the scientific program were also a number of extra-scientific events that testify to the diversity and liveliness of the community

Special session on practical quantum computing

A special session on the practical simulation of a quantum computer took place on Tuesday, July 1, 13:30-14:30. The session was chaired by I. Bloch and included a teleconference with T. Lanting from D-WAVE followed by the talk from M. Troyer of ETH Zurich on “Experiments on the D-Wave devices: quantum annealing on 500 qubits?”.

Special session Quantum Envoy comes to Florence: What is “Quantum”, really?!

Quantum Envoy is a special program from QUIE2T aimed at the dissemination of Quantum Information Science and Technology to a general audience.

A special session, open to the public, was organized in at the Auditorium S. Apollonia, located inside the former Benedictine convent of Sant'Apollonia, which was founded in 1339 and later enlarged in the 15th century. The Auditorium belogs to the Region of Tuscany and its use is shared with the University of Florence.

For the session organization we had the help of Kamna Pruvost who runs the Quantum Envoy programme in Oxford. We also relied on the SciCafè program of FP7.

The session was chaired by F. Bagnoli, the Italian coordinator of SciCafè, and staged two lectures with ample space for discussion.

The first lecture was delivered by T. Pfau from the University of Stuttgart and was dedicated to introducing quantum superpositions. It also staged a demonstration of interference using sound waves.

The second lecture was dedicated to the nature of light with many practical demos and was delivered by P. Kwiat from the University of Illinois.

Industry session

After the successful Industry Sessions hold at the previous QIPC meetings in Barcelona'07, Rome'09 and Zurich 2011, this year's Industry Session offered a platform for exchanges between academic researchers and industry leaders. The session took place on July 4, 14:30-16:00 and was chaired by Nicolas Gisin.

On the industry side, we heard Dr. Don Hayford, Senior Research Leader in National Security Global Business at Batelle (USA), and Mr. Dmitri Kisliakov, member of the Quantum Wave Fund Investment Team (USA). In particular, Don Hayford talked about "A Trusted Node QKD Network", whereas Dmitri Kisliakov delivered a presentation on "A 'Quantum' Investment Fund"

On new and promising potential applications of quantum technologies we had the young researcher Dr. Friedemann Reinhard from the University of Stuttgard (Germany) who held a talk on "Commercial Applications of Quantum Magnetic Field Sensors".

Young Investigator Award

This is described in detail in the next section, description of Task 4.2.

EU funding session

A special session on EU funding took place on Thursday, July 4, 17:00-18:00. In this session funding opportunities and future strategies for Quantum Technologies in Horizon 2020 were presented by Julian Ellis. Insights in the possibilities of the scientific and industrial community of QIPC to grow within the European Research Area was given by Janne Salo from ERC, and Isabel Vergara-Ogando from the European Commission. The session was chaired by Tommaso Calarco.

Conclusion

The QIPC 2013 conference in Florence continued the highly successful series of conferences that were initiated by the FP6 Coordination Action program QUROPE, and therefore assured a continuous coverage of major QIPC events in Europe every two years. The international QIPC conferences have a more than ten year tradition by now, and it is clear already that they are essential for the future development of the field.

This year has to considered as exceptional for the QIPC community as two of the founding fathers of the field received the Nobel prize in physics. The results presented at the conference covered European as well as overseas developments. We were quick to react to the upsurge of interest sparked in the news by the appearance of commercial products such as the DWAVE Computer. The Special session staged on Tuesday was indeed among the most attended. The Universal Quantum Computer is still a far fetched goal but many interesting byproducts are clearly appering outside laboratories.

The main feature of the conference was the very young age of the participating researchers which is a testimony of the liveliness of the field and its bright perspectives for the future.

Task 4.2 QIPC Young Investigator Award

The aim of this task is to provide some incentive and reward for excellent young researchers in the field of QIPC. The experience in the predecessor program QUROPE, in which the QIPC Young Investigator Award was established and awarded two times, has shown that there is a large number of highly promising, talented young scientists active in various disciplines of QIPC. The QIPC Young Investigator Award (for reasons of continuity the name is kept unchanged) will be given to a researcher under the age of 35 for the best research recently published or presented at a major conference. It is intended to bring some public visibility and recognition of the high-quality research carried out by young scientists, and to provide further impetus for their careers.

The work for this task includes the timely publication of a call for nominations, the evaluation of nominations under fair and transparent criteria, and the organization of the award ceremony itself. The prize will prospectively be awarded at the two major QIPC conferences organized by this work package, in order to achieve the highest possible public visibility.

Just like the evaluation of proposals for conferences in Task 4.1, the received nominations will first be screened by the WP leader and the Project Coordinator, and then be forwarded to the Advisory Board of Experts to obtain an official recommendation. This recommendation has to be approved by the QUIE2T Steering Committee by a simple majority vote. In case no majority can be reached, the vote by the Project Coordinator will be decisive.

In order to provide some incentive and reward for excellent young researchers in the field of QIPC, the 'QIPC Young Investigator Award' was established by the predecessor program QUROPE and proved to be successful in bringing public visibility and recognition to young researchers.

The prize is awarded to a researcher under the age of 35 for the best research recently published or presented at a major conference.

Already during the first reporting period, the leader of WP 4 had prepared the call for nominations including fair and transparent evaluation criteria. It has been validated by the project consortium and was published on the QUIE^{2}T web site. A total of five nominations were received within the deadline. The nominations were first screened by the QUIE^{2}T coordinator and the WP4 work package leader. After establishing the eligibility of the nominations, they were forwarded to the QUIE2T External Advisory Board of Experts who held a vote and issued a recommendation. This recommendation was then approved by the QUIE^{2}T steering committee.

The **2011 European Quantum Information Young Investigator Award** has been awarded jointly to

Dr. Ronald Hanson

''For his experimental work on the coherent control and measurements of single spins in solids, and his proven leadership and independence through the successful establishment of his own research group.''

and to

Dr. Stefano Pironio

''For his theoretical contributions to the study of quantum correlations and quantum communications, concerning in particular device-independent quantum cryptography.''

The prize was awarded during the QIPC 2011 conference in Zürich in Sep. 2011. The award ceremony was hosted by QUIE^{2}T work package leader Prof. Nicolas Gisin, who briefly introduced the two awardees, and presented them with their diplomas. This was followed by a short presentation of the work of the two prize winners.

Figure 2 From left to right: L. Theussl, N. Gisin, R. Hanson, S. Pironio, A. Wallraff.

The QIPC Young Investigator Award was presented to outstanding young researchers in the field of Quantum Information Processing and Communication during the QIPC international conference in Florence, on **July 4, 2013, at 16.30-17.00**. The award consists of a diploma and a lump sum of 4000€.

The **2013 European Quantum Information Young Investigator Award** has been awarded jointly to:

Dr. Fernando Brandao

"For his highly appraised achievements in entanglement theory, quantum complexity theory, and quantum many-body physics, which combine dazzling mathematical ability and impressive physical insight";

and to

Dr. Patrick Joachim Windpassinger

"For his broad experimental work in the field of quantum information processing, and especially for his recent achievements in the context of magnetism and synthetic gauge fields, which stand at the forefront of exciting developments in quantum simulation with cold atoms in optical lattices".

The award ceremony was hosted by Prof. Massimo Inguscio, who briefly introduced the two awardees, and presented them with their diplomas. This was followed by a short presentation of the work of the two prize winners.

Work Package 5: Management

Overview

WP5 objective is to guarantee the success of the project through the efficient and effective coordination and management (legal, financial and administrative), towards achieving of all of the agreed objectives. The Steering Committee together with the External Advisory Board and the Project Coordinator will be responsible for taking strategic decisions within the QIPC field and for control and updating of the CA work plan, possibly according to the community input.

The management team of the project with the Coordinator and the Executive Secretary with his team will assure that the project impact is optimized by addressing in a transparent appropriate and equilibrated way all sub-fields and geographical areas. It will ensure coordination with other projects of the QIPC FET cluster and coordination of the work of the entire QIPC community towards implementation of the common vision and strategy developed by this CA. WP5 will cover the administration and distribution of funding to other WP leaders (including the funding for conference events) to support the achievement of its goals. Finally, it will be the responsibility of this work package to act in response to any unforeseen events, e.g., prospective modifications of the work plan, amendments to the contract, and conflict resolution.

Objectives

This work package ensures the administrative coordination of the project. It will

- Manage all administrative and financial issues;
- Organize the annual project review and reports;
- Overview and coordinate the work performed by the work packages;
- Ensure effective use of resources;
- Act as a mediator and authoritative entity in case of problems, if any;
- Undertake any amendments to the contract and deal with associated legal issues, if any.

It is the responsibility of this work package to act in response to any unforeseen events, e.g., prospective modifications of the work plan, amendments to the contract, conflict resolution, and to work out a corresponding risk management plan.

Tasks

The work towards these objectives is grouped in two tasks; the corresponding achievements are outlined below. All deliverables of this Work Package are available for public download at

http://qurope.eu/projects/quie2t/wp5/deliverables

T5.1 Overall Management

The only task of this work package is to ensure the effective progress of the project as a whole towards its specified goals. It will do so by creating the necessary conditions for a successful and satisfactory delivery.

It will take care of all financial and administrative issues (accounting, reporting, etc.), and generally monitor and direct the work performed by the members of the project. It will ensure an efficient information and communication flow among the project partners and generally act as a representative and contact point for the project.

Period 1 (1.2.2010 – 31.1.2011)

Distribution of the Community Financial Contribution

The amount of EUR 314.167,00 was received as a pre-advance payment on 30.12.2009. From this amount, the following shares were distributed to the partners:

- P2 (UULM): EUR 22.000,00
- P3 (FBK-ECT*): EUR 44.000,00
- P4 (IOTA): EUR 22.000,00
- P5 (UNIGE): EUR 22.000,00
- P6 (UOXF.DU): EUR 22.000,00

Budget Re-Allocation

A budget re-allocation was agreed upon by partners P1 (IPSAS) and P4 (IOTA) whereas a sum of EUR 5.000,00 is transferred from the total budget of IPSAS to the budget of IOTA. The transferred amount is reserved to cover costs related to the activities of the Virtual Institutes and the Advisory Board of Experts. The reason for the re-allocation is that IOTA is the home institution of Elisabeth Giacobino, the head of the Advisory Board of Experts, and it is easier to pay her expenses directly from there.

Setup of the Coordination Steering Committee

The QUIE^{2}T Coordination Steering Committe (CSC) are the Coordinator (V. Buzek), the Executive Secretary (D. Binosi), the head of the Advisory Board of Experts (ABE) (E. Giacobino) and the directors of the four Virtual Institutes (N. Gisin, I. Walmsley, I. Cirac, P. Zoller).

Setup of the Advisory Board of Experts

The QUIE^{2}T Advisory Board of Experts (ABE) are:

E. Giacobino (Paris), R. Blatt (Innsbruck), H. Buhrman (Amsterdam), N. Cerf (Brussels), I. Cirac (Munich), A. Ekert (Cambridge, Oxford), Atac Imamoglu (Zurich), Massimo Inguscio (Florence), Sir P. Knight (London), Leo Kouwenhoven (Delft), M. Lewenstein (Barcelona), M.Plenio (London), E. Polzik (Copenhagen), G. Rempe (Munich), R. Werner (Hannover), A. Zeilinger (Vienna) and P. Zoller (Innsbruck).

List of project meetings

The first QUIE^{2}T project meeting, which was used as an effective kick-off meeting, took place in Brussels on March 19, 2010. Four QUIE^{2}T members (V. Buzek, E. Giacobino, T. Calarco, P. Grangier) were present to discuss some future plans, in particular the FET flagship initiative.

Another meeting took place on Tue July 6, at the Wadham College in Oxford, during the FP6 Cluster Review meeting. The following project representatives were present: Vladimir Buzek, Tommaso Calarco, Philippe Grangier, Ian Walmsley, Rob Thew, Kamna Pruvost, Carmen Zeques, Lukas Theussl.

The following topics were discussed in particular:

- 2011 Conference organization, Young Investigator Award
- Virtual Institutes: status and developments
- FET flagship initiative (Tommaso Calarco)
- Quantum Envoy

Project presentations

- July 7, 2010: QUIE^{2}T Overview, by Vladimir Buzek (QIP Open Day, Wadham College, Oxford)
- Oct 26, 2010: The QUIE^{2}T Coordination Action, by Carmen Zeques (FET Coordination Action Workshop, Brussels)
- Dec 15, 2010: The QUIE^{2}T Coordination Action, by Vladimir Buzek (European Workshop "From Quantum Foundations to Quantum Technologies - Challenges for Europe", Vienna)

Period 2 (1.2.2011 – 31.1.2012)

Distribution of the Community Financial Contribution

The amount of EUR 219.814,00 was received as the second-year payment on 27.5.2011. From this amount, the following shares were distributed from the coordinator to the partners:

- P2 (UULM): EUR 15.000,00
- P3 (FBK-ECT*): EUR 25.000,00
- P4 (IOTA): EUR 20.000,00
- P5 (UNIGE): EUR 15.000,00
- P6 (UOXF.DU): EUR 15.000,00

The remaining amount of EUR 129.814,00 was kept by the coordinator.

Budget Re-Allocation

A budget re-allocation was agreed upon by partners P1 (IPSAS) and P6 (UOXF.DU) whereas a sum of EUR 10.000,00 is transferred from the total budget of IPSAS to the budget of UOXF.DU. The transferred amount is reserved to cover various costs related to the dissemination activities and publications. No actual money transfer was effectuated; the change in budget will be taken into account at the final distribution of the community contribution.

Change of Project Officer

On 7.12.2011 Mr. David Guedj replaced Mr. Werner Steinhögl as the Project Officer responsible for monitoring the QUIE^{2}T project. The information was distributed to all project partners.

Development of the project web site

The work to develop and maintain the project web site has been monitored by the coordinator. This is covered in detail in the description of WP3.

Annual project review and reports

The first annual review of the QUIE^{2}T project was organized on Tuesday, 3rd of May 2011 in Bratislava. The local organization was secured by WP5, which included technical support and catering, as well as lodging for the participants. The overall progress of the project was certified to be good, with most of its objectives and technical goals achieved. Before that, the First Activity Report was assembled and written by WP5.

List of project meetings, dates and venues

- First QUIE^{2}T review, Bratislava, May 3rd, 2011. Present QUIE^{2}T members: D. Binosi, V. Buzek, P. Grangier, K. Pruvost, L. Theussl, R. Thew and C. Zeques.

- FET QIFT Open Day / Cluster Review, University of Warsaw, April 14-15, 2011. Present QUIE^{2}T members: D. Binosi, T. Calarco, L. Theussl, R. Thew and I. Walmsley.
- QIPC2011, ETH Zurich, September 5-9, 2011. Present QUIE^{2}T members: T. Calarco, N. Gisin, L. Theussl, R. Thew and I. Walmsley.

Project presentations

QUIE2T coordinator Vladimir Buzek was selected to share his experiences about running a CA at the FET Proactive Information Day - FP7-Call-9. The Information day took place on 18 Jan 2012 in Brussels and was attended by some ~250 people. The slides of the presentation are available for download at the Info Day Agenda web site[27].

[27] http://cordis.europa.eu/fp7/ict/fet-proactive/ie-jan12-ag_en.html

Period 3 (1.2.2012 – 31.1.2013)

Distribution of the Community Financial Contribution

The amount of EUR 18.519,00 was received as the third-year payment on 6.6.2012. Given this small amount, and that no major costs were expected in this period, this payment was not distributed from the coordinator to the partners.

Budget Re-Allocation

A second budget re-allocation was agreed upon by partners P1 (IPSAS) and P4 (IOTA) whereas a sum of EUR 6.000,00 is transferred from the total budget of IPSAS to the budget of IOTA. The transferred amount is reserved to cover the costs related to the dissemination and Quantum Envoy activities during the ICAP 2012 conference. No actual money transfer was effectuated; the change in budget will be taken into account at the final distribution of the community contribution.

Change of Project Officer

On 31.10.2012 a new project officer has been assigned to the project QUIE^{2}T. The new project officer is Aymard de Touzalin, however Dr. Matteo Mascagni is in charge of the day to day management of the QUIE^{2}T project on his behalf. He has been the contact point for any matters related to the QUIE^{2}T project.

Development of the project web site

The work to develop and maintain the project web site has been monitored by the coordinator. The project web site is hosted within the umbrella of the qurope.eu web portal and can be found at

http://quie2t.eu/

Annual project review and reports

The second annual review of the QUIE^{2}T project took place on 18th of April 2012 in Bingen am Rhein. The local organization was secured by the University of Mainz within the cluster review meeting that took place at that time, it included technical support and catering, as well as lodging for the participants. The overall progress of the project was certified to be good, with most of its objectives and technical goals achieved. Before that, the Second Year Activity and Management Reports were assembled and written by WP5.

Contract amendment

As it was anticipated and recommended by the reviewers at the last project review, the consortium has applied for a 6 months no-cost project extension in order to be able to organize the second QIPC conference in April/May 2013. The first version of the request for amendment letter was sent on 25/04/2012, i.e. only a few days after the second review. Due to various complications, the request was finally accepted on 18/01/2013.

It includes the following major changes to the Grant Agreement:

- Addition of one beneficiary
  The University of Florence (UNIFI) joined the consortium as partner P7 with effect on 01/02/2013. This addition was deemed necessary to allow a consortium partner to directly organize the second International QIPC conference, which will take place from June 30 – July 5 in Florence, Italy. UNIFI has been assigned two person months which were taken from the conference budget, *i.e.* the total budget of the project is unchanged.

- Modification of Duration
  The project was extended by 6 months from 36 to 42 months.

- Modification of reporting periods
  A fourth reporting period was added from month 37 to the last month of the project.
  This modification was against the will of the project consortium but was imposed by the European Commission during the negotiations. The original motivation for the extension was only to allow the second conference to take place within the running time of the project, with no major additional work required for the (original) project participants. The additional reporting period, including the associated additional review meeting, incurs a considerable additional effort and cost to participants that are otherwise inactive in this reporting period.

- Modification of Annex I – Description of work
  Some modifications were necessary to the DoW due to the changes above. One deliverable was added (D3.4.6), some were moved to the new end of the project (D4.1.2, 4.2.2, 5.1.4, 5.1.5 and 5.1.6). Also milestone M8 was moved from month 36 to 42. Additional work is expected from WP3 for some more dissemination activities during the last reporting period.

- Modification of legal entity details
  Partners P1 (IPSAS) and P4 (IOTA) have changed legal data (legal address or representative).

- The budget distribution was adapted according to the changes above; in particular the conference budget was moved from P1 (IPSAS) to P7 (UNIFI). Also some budget re-allocations have been taken into account between partners P1 (IPSAS) and P4 (IOTA) and P6 (UOXF.DU).

List of project meetings, dates and venues

- Second QUIE^{2}T review, Bingen am Rhein, April 18th, 2012. Present QUIE^{2}T members: D. Binosi, V. Buzek, T. Calarco, P. Grangier, K. Pruvost, L. Theussl and R. Thew.

Period 4 (1.2.2013 – 31.7.2013)

Budget Re-Allocation

Another budget re-allocation was agreed upon by partners P1 (IPSAS) and P6 (UOXF.DU) whereas a sum of EUR 5.000,00 is transferred from the total budget of IPSAS to the budget of UOXF.DU. The transferred amount is reserved to cover various costs related to the dissemination activities and publications. No actual money transfer was effectuated; the change in budget will be taken into account at the final distribution of the community contribution.

Contract amendment

After long discussions and negotiations, it was decided to request another amendment in order to include ETH Zurich as another partner to the project consortium. ETHZ had been the organizer of the first QUIE^{2}T conference, in order to avoid the same problems as for the Florence conference, it was decided to include ETHZ as well. The big complication in this case was that the conference had taken place already two years earlier, so the requested changes, together with the corresponding budget changes and cost claims, had to be implemented retro-actively.

The requested amendment includes the following major changes:

- Add new beneficiary ETHZ (partner P8).
- Add two person months for ETHZ (taken from the conference budget).
- Adapt the budget distribution to reflect the re-allocation between partners P1 and P8.
- Added a paragraph about supporting the Quantum Envoy event 'Quo vadis Quantum Hybridium'.

At the time of this writing, the amendment request is still pending.

Change of Project Officer

On 1.7.2013 Mr. Ivica Cubic replaced Mr. Matteo Mascagni as the Project Officer responsible for monitoring the QUIE^{2}T project. The information was distributed to all project partners.

List of project meetings, dates and venues

- Third QUIE^{2}T review, Brussels, April 18th, 2012. Present QUIE^{2}T members:
  D. Binosi, V. Buzek, P. Grangier, J. Nunn, K. Pruvost, L. Theussl, R. Thew and C. Zeques.
- QIPC'13, Florence, July 4th, 2013. Present QUIE^{2}T members: T. Calarco, F. Cataliotti, N. Gisin, P. Grangier, K. Pruvost, L.Theussl, R. Thew.

PLAN FOR USING AND DISSEMINATION OF KNOWLEDGE

The QUIE2T plan for using and disseminating knowledge is based on the work performed by Work Package 3 that is described earlier in this report. The main instrument for public visibility has been, and continues to be, the `qurope.eu` web portal that is hosting a few project sites, the QUROPE mailing list and the QIPC Virtual Observatory, among other things. The future availability of these resources is guaranteed by the successor project QUTE-EUROPE (http://qute-europe.eu/), that will take over the maintenance once the QUIE^{2}T project is finished. The availability of the main information channels (web site, mailing list, rss feeds, database updates, etc.) is therefore assured for at least three more years. QUTE-EUROPE will also continue the main activities that have been established as core CA features, in particular, the International QIPC conference, the Young Investigator Award, the Industry and Policy contacts, and the maintenance of the QIPC Roadmap and QICS. Thus, the experience and the knowledge accumulated in the course of the running time of QUIE^{2}T (and its predecessor QUROPE) will continue to be of valuable use for the QIPC community.

The table below gives only a brief overview of the main dissemination results during the lifetime of the QUIE^{2}T project. Each event has been described in more detail in the yearly project reports.

Date (Project month)	Type	Target Audience	Remarks
0	Web site	General public	http://qurope.eu/
2	Publication	Research, Policy	QIPC Roadmap version 1.7: http://qurope.eu/content/Roadmap
8	Exhibition	General public	Information stand at at ICT2010 (Brussels)
8	Presentation	Research, Policy	QUIE2T presentation at FET CA workshop http://cordis.europa.eu/fp7/ict/fet-proactive/ca-ws-oct2010_en.html
14	Exhibition	General public	Exhibit at FET'11: http://www.fet11.eu/
14	Flyer	General public	Project flyer presented at FET'11: http://qurope.eu/content/quie2t-project-flyer-and-press-release
14	Position paper	Policy	Input to EC Green Paper: http://qurope.eu/db/news/quie2t-input-ec-green-paper
16	Videos	General public	Popular videos on youtube: http://www.youtube.com/user/qubitlab
20	Conference	Research	QIPC'11: http://www.qipc2011.ethz.ch/
20	Presentation	Industry, Research	Industry session at QIPC'11

20	Presentation	Research, Policy	Funding session at QIPC'11
20	Videos	General public	The QubitLab: http://www.youtube.com/user/TheQubitLab/videos
23	Presentation	Research, Policy	QUIE2T presentation at FET Info day: http://cordis.europa.eu/fp7/ict/fet-proactive/ie-jan12-ag_en.html
25	Publication	Research	Quantum Information Classification scheme version 1.2: http://qurope.eu/content/qics-book
29	Conference	General public	Round table at ICAP'12: http://www-lpl.univ-paris13.fr/ICAP2012/roundtable.htm
31	Web site	Research, General public	QIPC Virtual Observatory: http://qurope.eu/db/news/qipc-virtual-observatory
32	Presentation	General public	Public talk at 'Quo vadis, quantum Hybridium?': http://quantum-hybridium.spin.cnr.it/
35	Web site	General public	The QubitLab on facebook: https://www.facebook.com/TheQubitLab
36	Publication	Research, Policy	QIPC Roadmap v. 1.8 and QICS v. 1.3: http://qurope.eu/db/news/qipc-roadmap-and-qics-updated
40	Conference	General public	Quantum Envoy in Oxford: http://www2.physics.ox.ac.uk/events/2013/06/06/quantum-envoy-comes-to-oxford
41	Conference	Research	QIPC'13: http://www.cqstar.eu/QIPC/
41	Presentation	Industry, Research	Industry session at QIPC'13: http://www.cqstar.eu/QIPC/industry.html
41	Presentation	Research, Policy	Funding session at QIPC'13: http://www.cqstar.eu/QIPC/program.html