Bringing the OpenMI to LIFE

Progress Report No. 2 -
1st April 2007 – 30th September 2007

Grant agreement number LIFE06 ENV/UK/000409

LIFE Grant Agreement Number

LIFE06 ENV/UK.000409

PROGRESS REPORT No. 2

Covering the project activities from 01-04-2007 to 30-09-2007

Reporting Date

31/10/2007

LIFE Project Name

Bringing the OpenMI to LIFE

Data Project

Project location	Europe
Project start date:	01/10/2006
Project end date:	31/01/2010 **Extension date:** -
Total Project duration (in months)	40 months **Extension months:** -
Total budget	€ 4,002,656
EC contribution:	€ 1,988,628
(%) of total costs	49.68%
(%) of eligible costs	50%

Data Beneficiary

Name Beneficiary	Natural Environment Research Council
Contact person	Mr Roger Moore
Postal address	Centre for Ecology and Hydrology, Crowmarsh Gifford, Wallingford, Oxon. OX10 8BB. UK
Visit address	Centre for Ecology and Hydrology, Crowmarsh Gifford, Wallingford, Oxon. OX10 8BB. UK
Telephone	Switch board: +44 1491 838800 Direct no. +44 1491 692235
Fax	+44 1491 692424
E-mail	rvm@ceh.ac.uk
Project Website	http://www.OpenMI-Life.org/

Title	Progress Report No. 2 - 1st April 2007 – 30th September 2007
Purpose	To provide the 6 monthly progress report required by the European Commission.
Document number	TaskE/ECREP2
Filename	U:\projects\OpenMI-LIFE\Reporting 2 Commission\Progress Reports\October2007\OpenMI-LIFE_Progress_Report_2.0_v3.doc
Editor	C. Isabella Tindall
Authors	Roger Moore, Isabella Tindall, Johan Van Assel, Yves Ronse, Ria Safiolea, Jan Gregersen
Document history	First draft, Second draft
Current version	3rd
Changes from previous versions	Comments from Steering Committee
Date	31st October, 2007
Status	Final draft
Copyright	

KEYWORDS
Integrated modelling
Integrated water management
Model linking
Open Modelling Interface and Environment
OpenMI
OpenMI Association
Water Framework Directive

ABBREVIATIONS

EC	European Commission
HarmonIT	The short name for the Framework 5 project called IT Frameworks
OA	OpenMI Association
OADC	OpenMI Association Dissemination Committee
OAEC	OpenMI Association Executive Committee
OATC	OpenMI Association Technical Committee
OpenMI	Open Modelling Interface and Environment
WFD	Water Framework Directive

[1] This does not include sub-contractors.

LIST OF CONTENTS

SECTION 1. EXECUTIVE SUMMARY

1.1. PROJECT OBJECTIVES

The Water Framework Directive demands an integrated approach to water management. This requires the ability to predict how catchment processes will behave and interact in response to the activities of water managers and others. In most contexts, it is not feasible to build a single predictive model that adequately represents all the processes; therefore a means of linking models of individual processes is required. This is met by the FP5 HarmonIT project's Open Modelling Interface and Environment (the OpenMI).

The purpose of this project is to transform the OpenMI from a research output to a sustainable operational Standard. It will build the capacity to use the OpenMI and will demonstrate it in real-life situations. It will also develop, test and demonstrate the future support organisation for the OpenMI. Finally, information about the OpenMI will be disseminated to users.

1.2. LIST OF KEY DELIVERABLES AND OUTPUTS

The key deliverables and outputs for the reporting period are:

- First Progress Report (April 2007)

Appendix 2 provides a detailed list of the task deliverables, dates of delivery and their current status.

1.3. SUMMARY OF THE FOLLOWING SECTIONS

The sections below report on the project's management, progress with the tasks, problems encountered, dissemination activities, work for the next period, financial issues and a review of progress. The Appendices give an overview of the project, the deliverables, partner information, publications and meetings.

In brief, the project's management and tasks are proceeding as planned. No unexpected problems have arisen. Task A is developing training strategies both for the project and the OpenMI Association in the light of recent experience. Task B has now made all its required models OpenMI compliant except PEGASE. PEGASE has been converted from the Unix to .net environments and is now ready to be made OpenMI compliant. Initial test runs have been completed successfully. Task C has completed making its models OpenMI compliant and has started the process of testing the models, running both independently and in linked mode. Task D has completed the legal phase of setting up the OpenMI Association and has started on the development of a forward strategy. Good progress has been made in preparing release 1.4 of the OpenMI Standard. The OpenMI Association has continued to work with the EC RTD to develop our contacts with the US and this is proving very fruitful. Task E has been developing the project's two websites. Communication is vital to the OpenMI's acceptance and a major contribution is being made to the planning of the OpenMI Association's long term strategy. The expenditure is broadly on track. Overall, the project is slightly under spent. The partners are happy with this position as they would like to build a reserve for the challenges that inevitably lie ahead.

SECTION 2. PROJECT MANAGEMENT

2.1. PROJECT CO-ORDINATION

The Table in Appendix 5 shows the formal Meetings and Workshops held to manage and co-ordinate the work of the project during the reporting period (earlier and future planned meetings are shown in grey). All meetings were run and minuted in accordance with the Collaboration Agreement. Where appropriate, the minutes were distributed to all partners and the European Commission and will be published on the website.

2.2. CHANGES TO PROJECT MANAGEMENT STRUCTURE

There have been no changes in the project management structure during the reporting period. No partners have withdrawn or been replaced. Appendix 3 lists, for each partner, the staff members involved in the OpenMI-Life project and their contact details.

2.3. PROJECT ORGANOGRAM

Figure 1 shows the project's management structure and reporting lines. These follow the proposal except that responsibility for quality will now lie with the task leaders, who are all Steering Committee members. Ultimate responsibility for quality will rest with the chairman. By this change, it is hoped to propagate a culture of appropriate quality throughout the project.

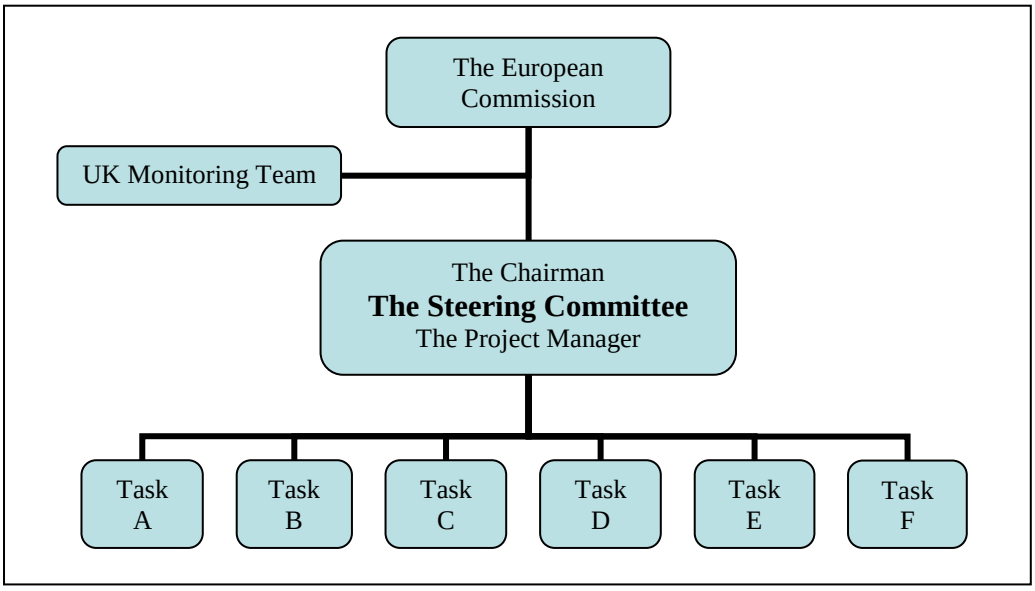

Figure 1 The structure and reporting lines of OpenMI-Life

2.4. PROJECT REPORTS

The following reports have been delivered during the reporting period:

Task F Collaboration Agreement
Task F First Progress Report to the Commission

2.5. PROJECT EXTENSION

At the time of writing, no extension of the project duration is needed or envisaged.

SECTION 3. TECHNICAL DEVELOPMENT

3.1. INTRODUCTION

The sections below describe the progress on each task during the reporting period.

3.2. TASK A – BUILD CAPACITY

3.2.1. Objective

Task A had no formal objectives for this period. However, it used the period and will continue in the next, to take the lessons learned in the first training exercise to prepare for the next training sessions and to develop the longer term strategy for the OpenMI Association.

3.2.2. Progress

A first set of training sessions has been completed for both target groups and for both Demonstration Basins. Please see Table 1 of Section 2 for details on the dates and attendees.

The continuing post course feed-back is still indicating that the training provided a sufficient basis for starting the migration work. However, some of the partners (especially those developers who are less familiar with Object Oriented Programming) are requiring support while migrating their first models. That support is in place and all attendees know how it can be accessed.

In the past six months period, discussions have started amongst the Steering Committee members on the approach, content and structure of the second set of training sessions (provisionally scheduled for month 20 of the project). These discussions are expected to be translated into a strategic note around the end of this year.

3.2.3. Issues

It has emerged that there appears to be a need for a generic type of training for end users which must enable a wide audience to understand the practicalities of a real life OpenMI application without having to be an expert in a particular model or tool. This issue will also be taken up by the strategic note on capacity building.

3.2.4. Plan and objectives for next period

The next period will focus on finalising the strategic note on capacity building. This will be offered for comment and approval by the project partners and the Steering Committee. This note will then be developed into a long term strategy for training provision by the OpenMI Association.

3.3. TASK B – DEMONSTRATE THE OPENMI IN THE SCHELDT BASIN

3.3.1. Objectives

The objectives for the second period (April 2007 – September 2007) were:

- to make progress in the process of making compliant, the models required for OpenMI-Life,
- to install the OpenMI compliant versions of the models required,
- to adapt the models required to be linkable : conceptual modifications,
- to perform first runs with the OpenMI compliant version of each model in order to validate them when running independently.

3.3.2. Progress

Four use cases have been proposed for the Scheldt. They are available on the website in the members only area at www.openmi-life.org:

- Use Case ‘a’ - ‘Linking a sewer flow model to a river flow model’ : definition report completed,
- Use Case ‘b’ - ‘Linking two (different) river flow models’ : definition report completed,
- Use Case ‘c’ -‘Linking two river flow models to a river quality model’ : definition report completed,
- Use Case ‘d’ - ‘Linking a 1D river flow model to a 2D estuary model’ : definition report completed.

Six models are required for the Scheldt use cases.

- InfoWorks CS, which is already OpenMI compliant,
- InfoWorks RS, which is already OpenMI compliant,
- MIKE11, which is already OpenMI compliant,
- PEGASE, which is not yet OpenMI compliant. PEGASE is a UNIX based model and UNIX is not yet a supported platform for the OpenMI. Therefore, during this second period, PEGASE has been migrated to the Windows environment, an extra step not appreciated at the proposal stage.
  It is currently forecast that the next step (to make PEGASE OpenMI compliant) will take until the end of 2007 to complete.
- Waqua, which has been made OpenMI compliant during this second period,
- Delft3D, which was already OpenMI compliant, has been upgraded for OpenMI-Life to enable it to exchange a greater range of quantities (modelled variables).

The partners Aquafin, VMM-AWA, Flanders Hydraulics and RIKZ have installed the OpenMI compliant version of the models required for the use cases in which they are involved. They have also performed first runs of each model in stand-alone mode. As expected, a number of modifications were necessary before the models performed as planned. However, following the changes, a number of preliminary linked runs were also successfully achieved. As the PEGASE model is not yet OpenMI compliant,

VMM-AK and ULG have not installed the OpenMI compliant versions of the models required for Use case c. This will happen as soon as the PEGASE model is OpenMI compliant.

When the three existing descriptions of the Dijle river used by the InfoWorks RS, MIKE11 and PEGASE models were examined more closely it was discovered that the effort to match the PEGASE model description to those of the other two would be greater than creating a new description. Accordingly, a new description has been prepared and is now ready for use.

3.3.3. Issues

The decision to work only in the .net environment created an extra task for ULG. This is now complete and they can start on making PEGASE OpenMI compliant. This experience has helped influence the decision that version 2.0 of the OpenMI should support both .net and java environments.

3.3.4. Plan and objectives for next period

The objectives for the next period (October 2007 – March 2008) are:

Use case ‘c’:

- to complete making the PEGASE model OpenMI compliant;
- to install the OpenMI compliant versions of the models on a PC and to validate them running independently against simple use cases;
- to prepare and build the linked running environment;

Use cases in general:

- to make any further changes to the models as necessary;
- to model the use case problems with the models unlinked;
- to link the models and to perform the first tests of linked running;
- to perform further tests with linked models.

3.4. TASK C - DEMONSTRATE THE OPENMI IN THE PINIOS BASIN

3.4.1. Objective

The sustainability of the Thessaly area natural and built environments depends greatly on quantity and quality of water in the Pinios. All three scenarios included in the OpenMI-Life Pinios study use the OpenMI technology to facilitate the integration of in-house developed models with suitable models of other developers in order to successfully represent the different processes that interact in the basin. The three case studies focus on different water management issues.

The objectives for the second period were:

For Use Case 1, to complete the quality control of the rainfall and stage data; to finish the migration of RISH-1D; to set up MIKE-11 and to link MIKE-11 and RISH-1D. For Use Case 2, to set up a MIKE-11; to account for specific climate change scenarios and to evaluate the optimum operation rules. For Use Case 3, to create a distributed

version of the UTHBAL model of the Lake Karla watershed; to couple the UTHBAL and Visual Modflow models; to test and evaluate the OpenMI interface; to apply the linked models to the use case and to start evaluating the Lake Karla restoration's effect on surface and groundwater resources.

3.4.2. Progress

During the last six months, the following progress was achieved in Pinios case studies. In Case Study 1, the input data were updated and checked for quality and consistency issues. The hydraulic model RISH-1D, built in Fortran, became OpenMI compliant. The water quality model used in the same case study (R-Qual) was modified to support the needs of Pinios scenarios. The migration of R-Qual is expected to be completed during the coming time period.

For Case Study 2, the reservoir model was populated with data and run for different scenarios. Furthermore, a MIKE-11 model was set up to calculate rainfall runoff for the subbasin part upstream of Smokovo. The objective was to test various scenarios using MIKE-11 and the Reservoir model in separate and linked runs and compare the results. The first conclusions will be presented on the coming 2nd OpenMI Life Workshop, on November 2007.

For Case Study 3, the monthly conceptual water balance UTHBAL model (Loukas et al., 2003) has been adopted for assessing surface water resources and deep infiltration at monthly time scale and the Visual Modflow model for assessing the groundwater resources. The rainfall runoff model has been modified in order to develop a ".net" version. The ".net" version of UTHBAL has been migrated to OpenMI interface. Visual Modflow is already OpenMI compliant. However, it has been discovered that Visual Modlfow does not have a general purpose ILinkableComponent that can be easily coupled with any rainfall runoff model including UTHBAL. Hence, the following actions were performed. The case study was examined firstly using the two models as stand-alone models. Application of the stand-alone models revealed the over-exploitation of the groundwater aquifer in Lake Karla watershed. Simultaneously, the UTHBAL model has been linked in real-time, using the OpenMI Interface, with the OpenMI examples – case studies and simple and realistic scenarios were examined to identify the problems of real-time linking in the OpenMI tool. The application results showed that the real time linking in the simple case studies were successful. Efforts are also being made to connect UTHBAL and Visual Modflow models using the OpenMI tool for Lake Karla watershed. The data required assessing the surface and groundwater resources after the Lake Karla restoration have now been assembled and are ready for the modelling exercise.

3.4.3. Issues

No significant difficulties were encountered in Use Cases 1 and 2. Apart from a 3-month leave of absence that the modeller of R-Qual had to take for health reasons; all other components of model migration and model set up progressed according to plan. For Use Case 3 difficulties were encountered in automating the linking process of UTHBAL as input to Visual Modflow. The reason is that the available version of Modflow does not include a separate Component for this purpose. Is it hoped that this issue will be overcome in the near future.

3.4.4. Plan and objectives for next period

The following goals have been set for the next period:

Use Case 1

- Run MIKE-11 and RISH-1D both in separate and linked modes for the November 2007 Workshop
- Test various scenarios of extreme flows
- Finish the migration of R-Qual and link it to MIKE-11 and RISH-1D

Use Case 2

- Test various scenarios in linked and separate modes and present the results at the November Workshop
- When the new 1.4 OpenMI .NET version is released, update the Reservoir Management model to become 1.4 OpenMI compliant and provide input on the additional effort and migration steps

Use Case 3

- Couple of the UTHBAL and Visual Modflow models within OpenMI interface for Lake Karla watershed (On-line application of UTHBAL and Visual Modflow models in the OpenMI interface)
- Test and evaluate the OpenMI interface using the case study
- Evaluate the Lake Karla watershed surface and groundwater resources (on-line application within the OpenMI interface) after the restoration of Lake Karla

3.5. TASK D – DEMONSTRATE THE OPENMI TECHNICAL SUPPORT, MAINTENANCE AND CO-ORDINATION

3.5.1. Objective

The success of the OpenMI as a standard depends upon its widespread adoption at the European level. However, its use requires a small but significant degree of investment by developers. Therefore, it will only be taken up if there is confidence that it will be supported and maintained into the future. This task will identify and test a sustainable support and co-ordination organisation. The specific objectives of Task D for the reporting period were:

- To formalise the procedures for supporting, maintaining and co-ordinating the OpenMI
- To trial and demonstrate the procedures by receiving requests for change to the OpenMI and the support mechanism, responding to the requests and, where appropriate, changing the OpenMI or the support, issuing periodic releases as open source.

3.5.2. Progress

3.5.2.1. Working procedures and protocols

The working procedures were written in the previous reporting period. No changes to these have been made during this period.

3.5.2.2. Building the support organisation for the OpenMI

The OpenMI Association charter was prepared and agreed by the provisional OpenMI Association Executive committee members. The initial membership and the Executive Committee were agreed at the Executive Committee meeting in Aartselaar, Belgium on 17th April 2007.

- Chairman: Roger Moore (CEH)
- Deputy Chairman: David Fortune (WSL) (accepted – 06/09/2007)
- Secretary: Michiel Blind (RIZA)
- Treasurer: Peter Gijsbers (WL Delft)
- Members: Eleftheria Safiolea (NTUA)
  Jan B. Gregersen (DHI)

This group is referred to in the Charter as members 'for the first time' and they may remain in office for three years. On 4th June 2007, the OpenMI Association was registered in the Netherlands and thus formally established as a legal entity. The signatories were Roger Moore, Michiel Blind and Peter Gijsbers. The first General Meeting was held in Delft in The Netherlands on 4th October 2007. Although this meeting was a formality, it was a necessary step in establishing the Association. The organogram for the OpenMI Association is shown in Figure 2.

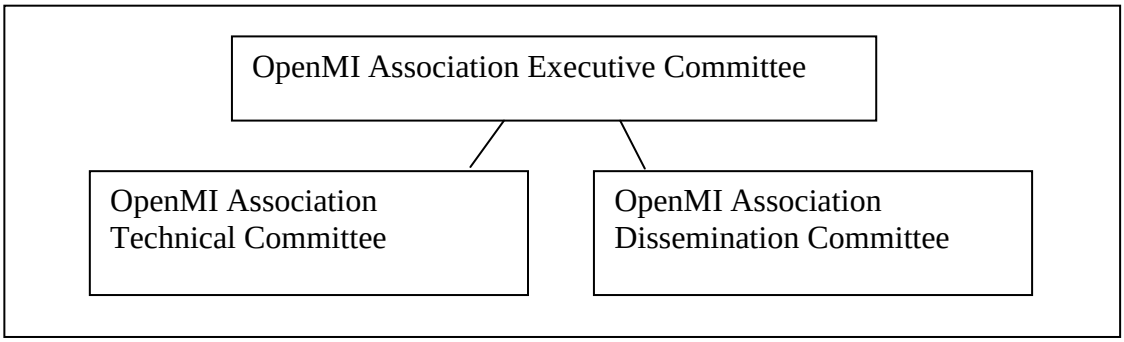

Figure 2 Organogram for the OpenMI Association

3.5.2.3. OpenMI Association Executive Committee (OAEC)

The OpenMI Executive Committee had one meeting during the reporting period on 6th September 2007 in Hørsholm, Denmark.

The main activities for the Executive Committee have been:

- Establishing the OpenMI Association
  - Preparation of the Charter and standing orders
  - Formal registration of the OpenMI Association in the Netherlands
  - Holding the First General Assembly

- The OpenMI 1.4 release
  The OpenMI 1.4 release is an important step towards a sustainable way of handling the standard. Being a standard provider is very different from being a software provider. Many discussion about how to deal with this has taken

places among the OAEC members with advice from the OpenMI Association Technical Committee.(see more details about this under the OpenMI Association Technical Committee section below).

- Corporation with the CUAHSI project.
  The American NSF funded CUAHSI project has decided to use OpenMI as one of their core technologies. The OpenMI Association has established a close corporation with this group. There have been two web conferences and one of the OATC members (Gennadii Donchyts, WL| Delft Hydraulics) has visited USA twice providing assistance in migrating the HEC and the MODFLOW models to become OpenMI compliant. Planning for a joint workshop with key persons from OpenMI Association and CUAHSI has been initiated. One of the key developers in the CUAHSI project, Jon Goodall will participate in the OpenMI Association Technical Committee December meeting in UK.

- Strategy.
  The take up of the OpenMI by leading model developers is dependent on the OpenMI Association having a credible published strategy. The first steps in formulating such a strategy for the OpenMI Association have been taken. A dedicated strategy meeting will be held at the end of October 2007 in the Commissions offices when the Commission will attend. The Strategy will be exposed to public debate at the Workshop in November 2007.

3.5.2.4. OpenMI Association Dissemination Committee

The main task for the OpenMI Dissemination committee during the reporting period has been to design and develop the new OpenMI Association web site. This site will replace the current web site on www.OpenMI.org.

Much effort has been made to create a website where users with different profiles will be guided to the relevant information. This is important since the OpenMI Association is targeting two very different groups; ‘end-users’, who are mostly interested in how OpenMI can be used to support integrated modeling, and ‘developers’ who are interested in the technical details of the OpenMI and need to know how to make components and/or models OpenMI compliant.

This first draft layout of the new web site is shown in Figure 3. The final version is expected to be up and running by the end of November (the same time as the OpenMI 1.4 is scheduled to be released).

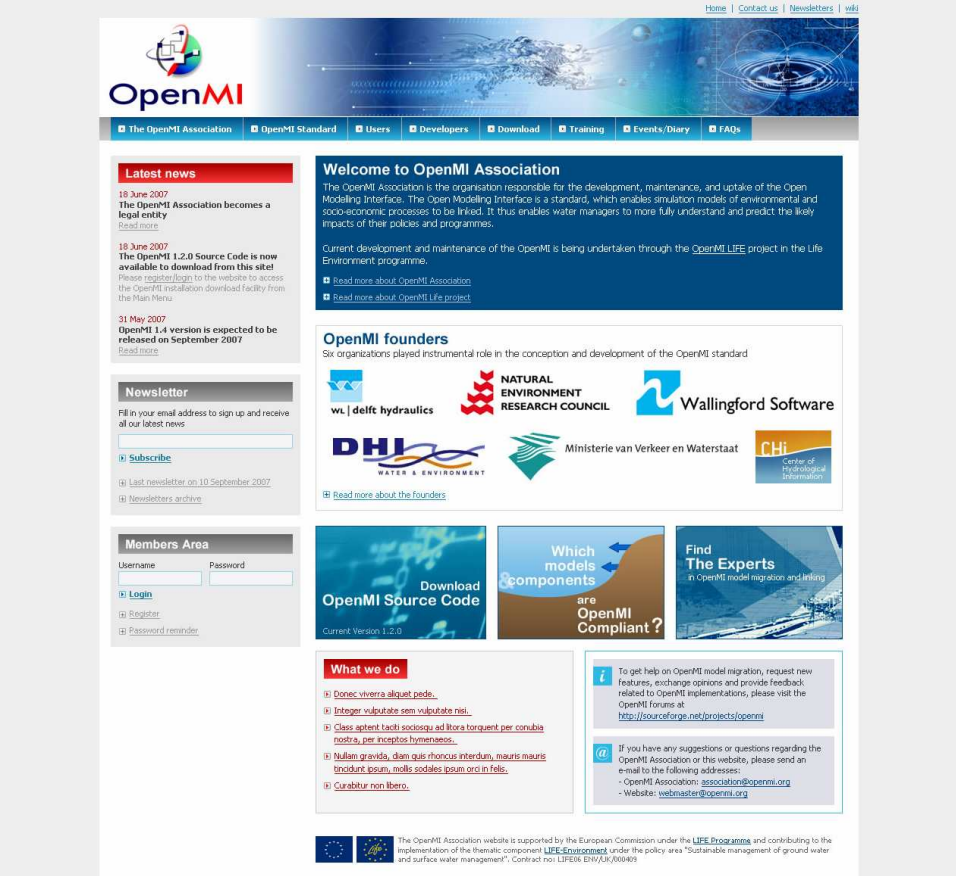

Figure 3 Draft layout for new OpenMI Association website

3.5.2.5. OpenMI Association Technical Committee (OATC)

During the reporting period the OpenMI Association Technical Committee had three technical meetings (see Appendix 5). Agendas and minutes from these meetings are available on: http://www.lictek.dk/openmi/. The OATC activities for the reporting period are described below:

(a) Support and feature requests.

OATC is supporting OpenMI users, which also includes the users from the OpenMI LIFE use cases, through the discussion forum on source forge. The level of activity in these forums has been lower that usual during this reporting period; only 22 new items posted. See: https://sourceforge.net/forum/?group_id=136874

(b) OpenMI Developments

The developments are following two parallel tracks; the OpenMI 1.4.0.0 release and the OpenMI 2.0.0.0 release.

(i) OpenMI 1.4.0.0 release

The main driver for the OpenMI 1.4.0.0 release has been to solve compatibility problems that arose when linking OpenMI components using different versions of the OpenMI.

In previous OpenMI releases, the OpenMI standard assembly, the OpenMI configuration editor (OmiEd), and the OpenMI utilities (libraries supporting developers in migrating models to become OpenMI compliant) has been released as

one single downloadable installation package. This led to some components being re-released even though no changes had been made to them. Because of the way in which the version numbering system worked, incompatibilities could arise when linking models from different releases.

In order to solve these problems and in order to make further developments, maintenance, and support for the OpenMI Association software more efficient and safe, the entire source code was restructured. In the new structure there is a clear distinction between the OpenMI standard and everything else. This distinction is reflected in the used namespaces for classes and interfaces, in the new directory structure on SourceForge (the OpenMI version control server) and on the new download section of the new OpenMI web site. See Figure 4:

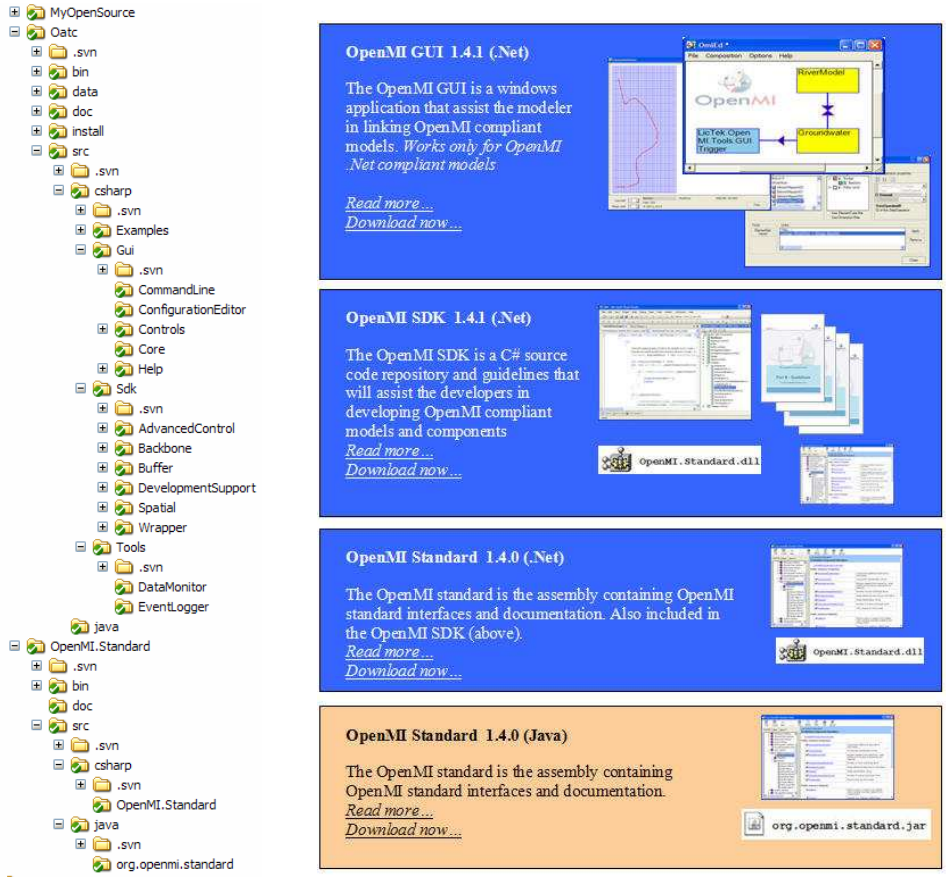

Figure 4 The new directory structure for the OpenMI source is shown to the left. Everything that related to the OpenMI standard is under the OpenMI.Standard folder and all other things are under the Oatc folder. The draft layout for the OpenMI download section is shown on the right

The new structure fits with the new OpenMI Association organization. The OpenMI standard is the core deliverable of the OpenMI Association. Any changes to the standard must be accepted by the OpenMI Association Executive Committee, whereas as changes to supporting tools and libraries can be made be the OpenMI Association Technical Committee. The OpenMI standard is what ensures that components from different providers can be linked, whereas the tools and libraries only support using the OpenMI. The OpenMI standard should be kept stable (unchanged) for long periods (more that one year), whereas the supporting tools and utilities should be

updated and improved more frequently. So the new structure makes it possible to find the right balance between stability and flexibility.

Tools and libraries in the new structure are placed under the OATC, which is reflected both in the namespaces and the directory structure. The OpenMI configuration editor (OmiED) will be released as a normal windows installation, since this application is targeting the end-users. The former OpenMI Utilities package is now called the OpenMI software development kit (Oatc.OpenMI.Sdk) and it is released as a zipped directory structure with the source code. By doing so, it will be clearer to the developers that this code is can be improved by the developers and that the model provider has to compile and distribute the compiled assemblies along with their software.

The OpenMI source licence for the OpenMI SDK has been changed from *LGPL* to *New BSD*. The LGPL licence required developers who made changes to the source code to submit a copy of the changes to the OpenMI Association. With the New BSD licence, there is no such requirement. This combined with the absence of royalty or licence fees will make the OpenMI attractive to commercial developers.

This whole exercise of restructuring the OpenMI source code and changing the licensing has been an important learning process for the OpenMI Association. We have gradually realized where the differences are between being a software provider and being a standard provider.

The Java version of the OpenMI standard was withdrawn in the previous reporting period. We had worries that maintenance and development of two different tracks would harm the overall progress. However, we realized that there was a clear call from the Java communities to have a Java version of the OpenMI standard. With the clearer distinction between the OpenMI standard and the OpenMI SDK, it is now feasible for the OA to support both Java and .Net. It was therefore decided to bring Java back into the OpenMI Standard. An OpenMI Java standard will therefore be released with the OpenMI 1.4.0.0 release (expected to be released late November 2007). The Java version of the OpenMI SDK will be delivered by Alterra in the Netherlands and not the OpenMI Association.

(ii) OpenMI 2.0.0.0 release

The OpenMI version 2 architecture has made progress during this reporting period, but is not expected to be completed before the end of 2007 (See Figure 5).

In the reporting period, the main focus has been on improving the way the standard supports configuring. In OpenMI version 1.* ‘the link object’, which ties two components together is always provided by the application that is used for creating the configuration, which, in most cases, means the OmiEd configuration editor. In version 2 the link object will be provided by the LinkableComponent that is delivering data. This relatively small change will make it possible for model providers to make clearer and faster performing implementations, as smart code can be imbedded in the link object.

When a link is established between two linkable components, data operations (eg. Unit of measurement conversions) must be selected and configured. Data operations

are methods provided by the component that is delivering data, and offers facilities to alter the delivered data on-the-fly. Such alterations could be changing the data to be represented on the grid/geometry of the receiving component (so called spatial data operations), simple temporal averaging or other operations. Getting the data operations defined in a clear and useful way was one of the most challenging issues when OpenMI 1.0 was developed. Even though the current OpenMI 1.* architecture works well with respect to data operations, there are still many things that can be improved. So, improving the OpenMI architecture for handling data operations is where most focus has been.

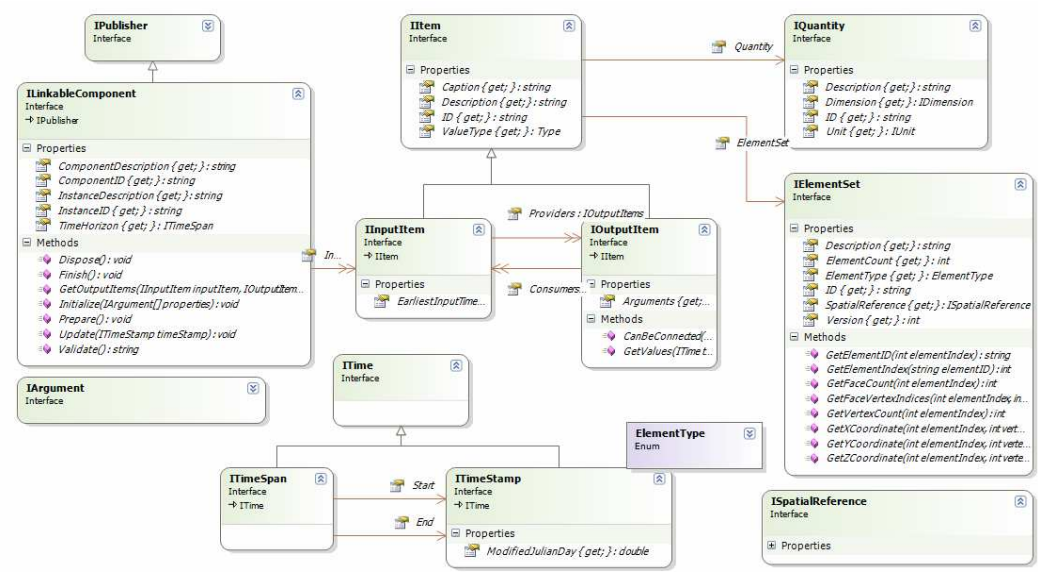

Figure 5 The OpenMI version 2 standard interfaces as they currently look

3.5.3. Issues

There were no significant issues during the reporting period

3.5.4. Plan and objectives for next period

Goals for the next period are:

- To release version 1.4.0.0. of the OpenMI Standard
- To continue development of version 2.0
- To contribute to the development of the OpenMI Association Strategy. Especially on communication, documentation and technological issues.
- To provide support for users
- Further develop US links leading to Workshops and projects

SECTION 4. PROBLEMS ENCOUNTERED

Project progress is monitored continuously by the Task leaders and three to four times a year by the Steering Committee. There were no significant problems encountered or deviations from the work plan during the reporting period. All the partners are working well together and making good progress on their Task objectives.

It is the objective of OpenMI-Life to move the OpenMI from the research environment to the operational sphere. It is anticipated that there will be some problems in this process. It is the express purpose of OpenMI-Life to identify and solve them before the OpenMI goes out to the wider world.

SECTION 5. DISSEMINATION (TASK E)

5.1. OBJECTIVE

The objectives of the OpenMI-Life dissemination activities are to plan and implement a dissemination programme that will include: a. Reviewing the OpenMI user community identified in HarmonIT; b. Maintaining and extending awareness of the OpenMI in its potential European and global user communities; c. Identifying the most effective media for communication with each group within the community ; d. Planning a dissemination programme together with opportunities for external evaluation and feed back; and e. Implementing the programme. The dissemination deliverables are a best practice manual, papers and journals, press articles, conference presentations, OpenMI-Life and OpenMI Association websites, workshops, leaflets, posters, and a layman's report. The dissemination task is split into two parts. One covers the dissemination of information about the OpenMI-Life project (guided by the OpenMI-Life Steering Committee), while the other has a broader scope and covers the overall dissemination of the Open Modelling Interface. The focus for this period has been the development of the websites for release in the next period.

5.2. PROGRESS

Three major steps towards satisfying the OpenMI dissemination objectives were taken in the past period. First, on the 16th of April, 2007, the OpenMI Association Dissemination Committee gathered to review the OpenMI dissemination goals and establish procedures to achieve these goals. The past Dissemination strategy during the HarmonIT project was briefly discussed. Two main interest groups were identified: code developers and end users. The main dissemination deliverables, such as the websites, the newsletter, press articles, flyers, posters, and manuals should therefore be designed. In particular, the OpenMI Association website was accordingly redesigned to satisfy their requirements. Furthermore, the OpenMI-Life website was translated to a second project partner language, Greek, to improve communication with local end users and developers and promote the international character of the project. More information regarding the websites is included in section 5.6 below. Following the creation of the OpenMI Association a contact list has been started. The list will be used to reinforce or re-establish links between the greater OpenMI community. All contacts will receive the 1st OpenMI electronic newsletter, will be invited to register to the new OpenMI website, and will be encouraged to follow the developments of the OpenMI-Life project, as presented at the OpenMI-Life website. To determine OpenMI Association members needs, a Questionnaire has been compiled. This will be distributed in the next period.

The second major dissemination step during the last 6 months was the promotion of OpenMI platform outside the European boundaries. Primary outcomes of that effort were shown both in Academia and Industry. HEC-RAS (the hydraulic model of the US Army Corps of Engineers) became OpenMI compliant. The Open Modelling Interface was taught last semester as part of Prof. Maidment's Hydrology class at the

University of Texas at Austin, US. Also, OpenMI compliant components were developed by the CUAHSI group (Consortium of Universities for the Advancement of Hydrologic Science, Inc) to use when coupling their web services and observations database with hydrologic simulation models. A Webex TelCon session between selected OpenMI and CUAHSI modelers last July reinforced the communication of knowledge among the two groups.

Finally, the third major dissemination step of the last semester was OpenMI Association becoming a legal entity under the Dutch Law on June 2007. The newly established Association will provide stability and guidance to future dissemination efforts while it will offer to all interested individuals or groups the prospect of actively participating in the future of OpenMI.
Regarding the OpenMI-Life project specific deliverables, the following tasks were completed during the last 6 months: a multilingual OpenMI-Life website, conference presentations, several publications (an article, 2 posters, a contribution to the HarmoniCA Newsletter, the creation of an OpenMI flyer and a contribution to a participating company's Newsletter), and an OpenMI session at the HarmoniCA workshop last September. The 1st OpenMI electronic Newsletter will be issued next month and will include material related to the latest OpenMI developments .

5.3. ISSUES

No special concerns exist regarding dissemination at this point.

5.4. PLAN AND OBJECTIVES FOR NEXT PERIOD

The 1st OpenMI Electronic Newsletter is edited and will be released on the first week of November, 2007. The timing of release is such to coincide with significant milestones of the OpenMI-Life project, communicate previous achievements and prepare the greater community about significant coming events. Also, preparations are under progress for the November Workshop where modellers outside the OpenMI-Life project community are also invited to attend. After the November Workshop, an OpenMI-Life multilingual leaflet will be prepared to inform the interested parties about the objectives and current status of the project, the recent modelling developments and the next modelling steps of the project partners.

5.5. PUBLICATIONS

NTUA prepared and presented a poster entitled "Bringing OpenMI to Life"at the Floodmed Workshop (July 2007) which was dedicated to Rainfall-Runoff modelling. The Workshop participants were major model developers and end users at a European level. UTH team participated in the 6th International Conference "ModelCARE 2007 Calibration and Reliability in Groundwater Modelling, Credibility of Modelling" Copenhagen, Denmark, 9-13 September, 2007, with one peer-reviewed scientific publication. The details of the publication are given in Appendix 4 .

5.6. COMMUNICATION (WEBSITE)

The OpenMI-Life project supports the development and maintenance of two websites: the OpenMI-Life website (www.openmi-life.org) and the OpenMI Association website (www.openmi.org). The multilingual version of the OpenMI-Life website was launched and is currently operational to improve communication among the

OpenMI-Life project's end users. The multilingual aspect of the website promotes the LIFE project developments to local Competent Authorities that may not feel very comfortable with English terminology, captures new users, improves awareness, and builds relationships.

Following the guidance of the OpenMI Dissemination Committee, an updated OpenMI Association website will be operational before the end of year 2007. Additional features of the updated OpenMI Association website will be: a) A separate End Users area that will include sections on case studies, compliant software, OpenMI migration and linking experts, publications, related projects and sites b) A separate Developers Area which will provide information on developers progress (technical groups), examples and design patterns, technical meetings, papers, and release news c) A link to an OpenMI wiki which will allow OpenMI developers and users to contribute and exchange ideas, d) An OpenMI Association Members Area where members will be able to read Minutes of Committee meetings, participate in future developments, and receive additional support regarding the latest OpenMI applications, e) A Registered Users website Area that will provide Download material, information, and help to registered users and f) Newsletter Archive, with links to all previous electronic Newsletters.

SECTION 6. ENVISIONED PROGRESS UP TO 31ST MARCH 2008

This section provides a summary of envisioned progress up to 31/03/2008. For full details of progress in each task see sections 5 and 7 above.

Task A has no formal objectives in the next reporting period but will be actively contributing to the training element of the OpenMI Association strategy.

Task B and C, the Scheldt and Pinios demonstrations, will complete making their models OpenMI compliant and move on to testing them running individually and in coupled mode.

Task D will develop a first draft of the OpenMI Association's strategy and expose it to public scrutiny. It will also plan how the OpenMI Association will communicate with the user community and allow them to contribute. Version 1.4 of the OpenMI will be released and development of version 2.0 will continue.

Task E will release the upgraded websites. It will also mount OpenMI-Life's first public workshop. With assistance from DG RTD, joint work will be planned with our US colleagues in the Environmental Protection Agency and the National Science Foundation.

In the next reporting period, specifically from January 1st 2008, WL | Delft Hydraulics will be part of Deltares. Deltares is a new Dutch technological institute on Delta-issues, where the former institutes WL | Delft Hydraulics, GeoDelft, (parts of) TNO-NITG and (parts of) Rijkswaterstaat will be merged.

SECTION 7. FINANCIAL ISSUES

Table 1 shows the project costs for all partners incurred since the start of the project up until 31/03/2007.

Table 1 Project costs incurred

	Cost category	Total cost according to the Commision's decision	Costs incurred from the start date to 30/09/2007	%
1.	Personnel	2,660,632	706,320	26.5
2.	Travel	544,450	58,520	10.7
3.	Outside assistance	422,080	52,972	12.6
4.	Durables: total non-depreciated cost			
	- *Infrastructure sub-tot.*	0	0	0
	- *Equipment sub-tot.*	50,800	13,382	26.3
	- *Prototypes sub-tot.*	0	0	0
5.	Consumables	10,000	0	0
6.	Other costs	54,500	12,424	22.8
7.	Overheads	260,194	58,448	22.5
	SUM TOTAL	**4,002,656**	**902,066**	**22.5**

The major item in the project costs is staff time and the expenditure here is in line with the expected rate of spend. Overall, the project is slightly under spent at this point. The partners are comfortable with this as they would like to build a reserve to deal with the inevitable challenges that lie ahead.

SECTION 8. PROGRESS AND PLANNED ACTIVITIES

At present, the project is, overall, on schedule. The current plan is shown in the Gantt chart in Figure 6. Details of the plan can be found in the Proposal.

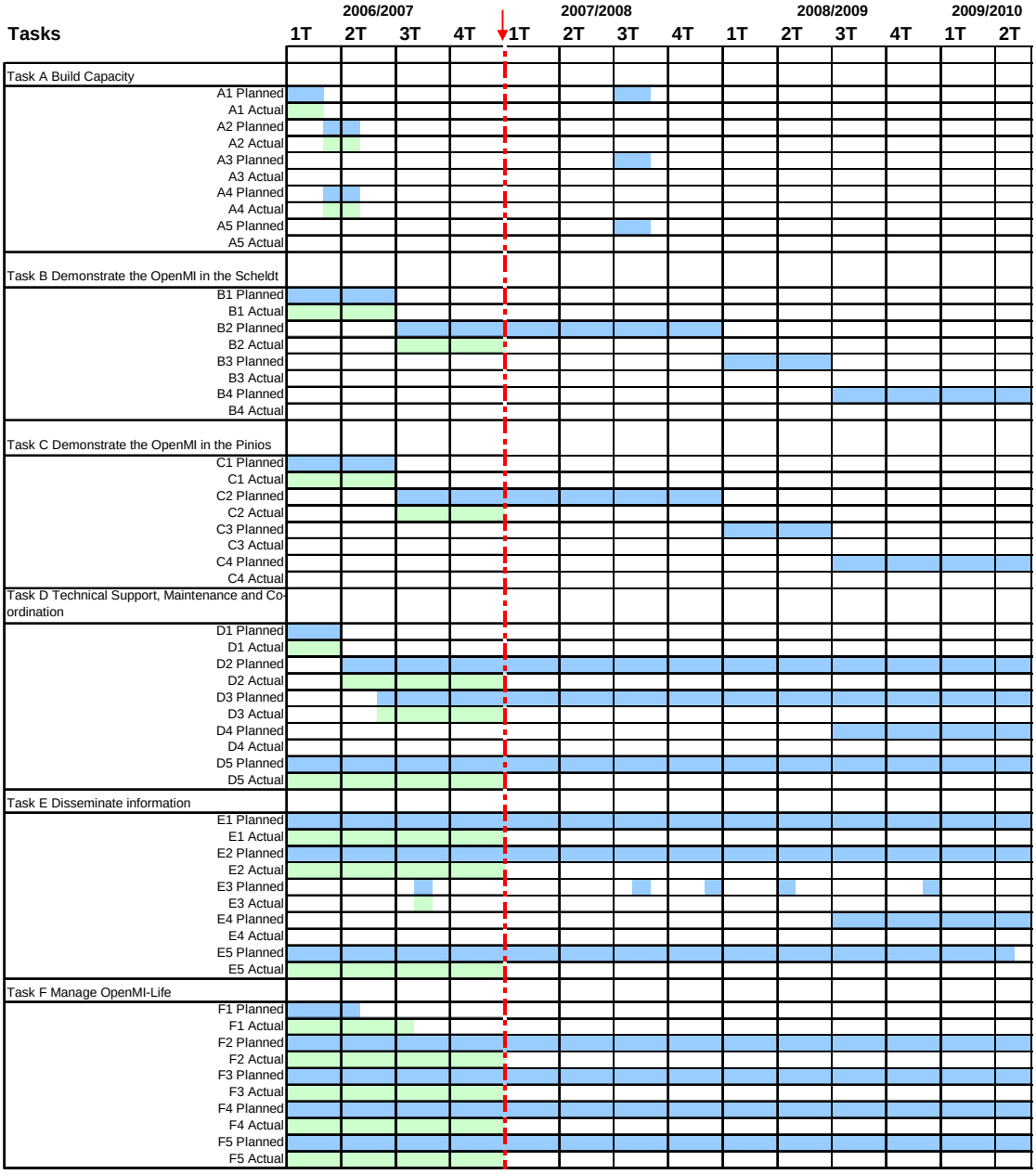

Figure 6 Overview of the OpenMI-Life Work plan

SECTION 9. APPENDICES

Five Appendices are provided below giving information on the following topics:

- Project Summary for OpenMI-Life
- Task Deliverables and their Status
- Participant Information
- Publications
- Meetings

APPENDIX 1 PROJECT SUMMARY FOR OPENMI-LIFE

The goal of OpenMI-Life is to support the implementation of the Water Framework Directive (WFD) and, more particularly, make integrated water management feasible. This requires an ability to predict not only how individual catchment processes will respond to 'programmes of measures' but also to foresee how those processes will interact with each other. Prediction is achieved through the use of models but until the development of the OpenMI, no generic open practical mechanism existed that could link together models of different processes from different suppliers running on different machines – see State-of-the-Art section. HarmonIT, funded by FP5, has developed and proved the highly innovative concept of the Open Modelling Interface, which solves this complex problem. OpenMI-Life will demonstrate how it can be deployed, used, supported and funded at the operational level on real world scale problems. This demonstration will be conducted in co-operation with Competent Authorities in two Pilot River Basins, the Scheldt and the Pinios. It will also show how requests by users for changes to the interface will be handled and implemented. It is the intention that the procedures and systems demonstrated and refined in this project will continue after the project. The long term aim is that the OpenMI should become the European and global standard for model linking in the environmental domain.

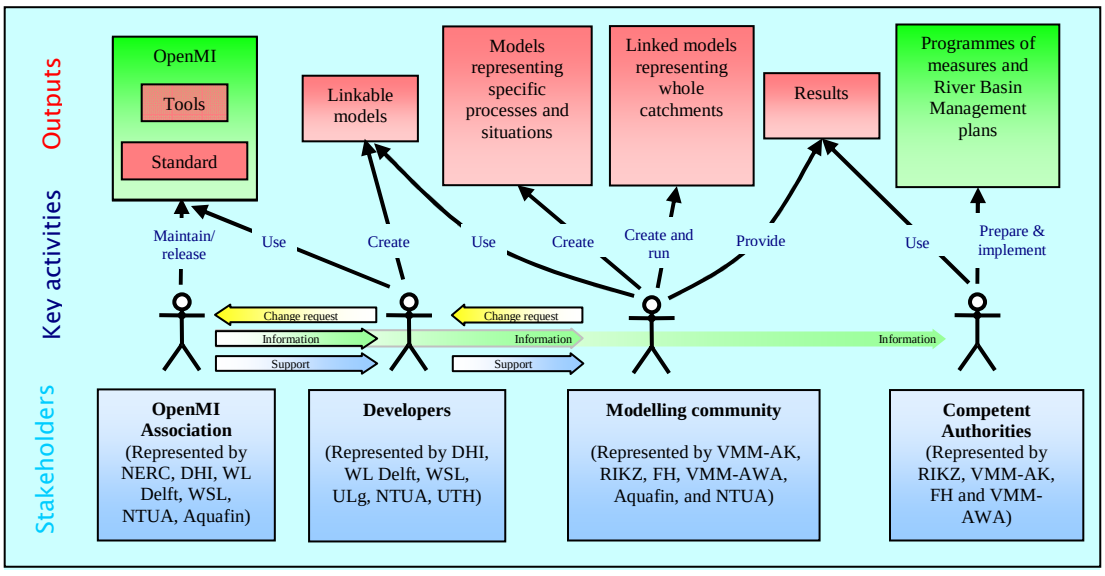

Figure 1 Simplified view of stakeholders and their involvement in the use, maintenance and dissemination of the OpenMI

Figure 1 illustrates the key stakeholders, procedures and products involved in the use, evolution and maintenance of the OpenMI. The tasks listed below are designed to demonstrate the OpenMI and these procedures working at an operational level. It is anticipated that the project will identify the need for change both in the OpenMI and the support procedures. The demonstration will show that both types of request can be handled in a sustainable way. Listed below are the main tasks involved in staging the demonstration:

A)Build capacity : For the OpenMI to become widely adopted there must be a core of knowledgeable modellers. This task will create and deliver training courses to developers, modellers and users in the Competent Authorities of the Scheldt and Pinios and the wider modelling community if resources permit.

B)Demonstrate the OpenMI in the Scheldt and C) the Pinios river basins : The Scheldt and Pinios are Pilot River Basins where implementation of the WFD is being trialled. Both basins contain problems whose management requires an integrated approach and hence the use of linked models. The Competent Authorities of these basins will identify a range of problems. The modelling community will use models linked by the OpenMI to perform an integrated analysis of the problems and indicate the likely outcomes of different policies to the Competent Authorities. Model providers will upgrade the relevant models to be OpenMI-compliant so that they can be linked. The OpenMI Association will maintain and support the OpenMI making new releases in response to requests for change. An evaluation report will assess the value of a) integrated modelling and b) the OpenMI and its support organisation.

D)Demonstrate the OpenMI technical support, maintenance and co-ordination : The success of the OpenMI as a standard depends upon its widespread adoption at the European level. However, its use requires a small but significant degree of investment by developers. Therefore, it will only be taken up if there is confidence that it will be supported and maintained into the future. This task will identify and test a sustainable support and co-ordination organisation. The demonstration will begin using the current open source version of the OpenMI, the research output of HarmonIT. It is expected that this will not satisfy all the user needs. The resulting change requests will be used to exercise all aspects of the support organisation including the periodic release of new open source versions of the OpenMI standard and its supporting software and documentation.

E)Disseminate information : Global awareness of the OpenMI has been achieved in the water modelling community. If the OpenMI is to be widely adopted, it is essential that this is maintained and, ideally, extended into other domains. This task will confirm the target community and the best media for communication. It will then use those media to deliver appropriate information about the OpenMI and the benefits of integrated modelling.

F)Manage OpenMI-Life : The transformation of an IT product is a complex task involving risk. Substantial time will be allocated for active monitoring and management. A risk management plan is in place.

Figure 1 shows the OpenMI-Life participants and the stakeholder roles they will represent in the demonstration. The '**Competent Authorities**' responsible for implementing the WFD and IWM are represented by VMM-AK, FH, VMM-AWA and RIKZ who are, in their domains, the competent authorities for the Scheldt Basin. They are actively involved in the preparation of programmes of measures and the development of River Basin Management Plans. VMM-AK and RIKZ are leading members of the International Scheldt Commission. They have also been members of the Interreg III Scaldit project, which tested the implementation of the WFD. VMM-AK, RIKZ, FH, VMM-AWA, Aquafin, and NTUA represent the **modelling community**. VMM-AK, RIKZ, FH, VMM-AWA are regulators and Aquafin is the

company responsible for waste water treatment for the whole of Flanders. All actively own and use models to analyse water management problems and *are anxious to know if integrated modelling will lead to better, more integrated solutions to water management problems*. DHI, WL Delft, and WSL represent the major commercial **model developers** in Europe and probably the world. ULg, NTUA and UTH are academic developers, many of whose models have been taken up commercially. In the demonstration, the developers will interact with the modelling community and the OpenMI Association as they would in a real world context. Their motivation is to understand the opportunities and the threats that the OpenMI creates together with the costs and savings. They will receive requests for change to their models from the modelling community. If these requests require a change to the OpenMI, they will pass them to the **OpenMI Association** represented by NERC, DHI, WL Delft, WSL, AQUAFIN and NTUA. These organisations have been responsible for leading the €6M FP5 HarmonIT project that created the OpenMI and have planned the support organisation. NERC, DHI, WL Delft and WSL all have experience of maintaining standards and software on a national and international basis. All have a long term interest in and understanding of water management. NTUA managed the global dissemination programme for HarmonIT. Their collective interest is to be sure that the proposed support organisation is viable.

The OpenMI-Life project will be led by **the UK Natural Environment Research Council (Centre for Ecology and Hydrology) (NERC),** a world class research organisation with over 2500 staff and turnover in excess of €420M. Its science programme covers most aspects of the natural environment and related technologies; of particular relevance to OpenMI-Life are: hydrology, ecology, integrated management (especially of water resources), sustainable economies, modelling, data management, database design and environmental informatics. NERC works with both the public, private and academic sectors and has extensive experience of managing large national and international projects. It is committed to the delivery of its science to the user community and the market place. NERC has successfully led and managed the 14 partners from 7 countries, who developed the OpenMI over 4 years through the €6M FP5 HarmonIT project (Contract No EVK1-CT-2001-00090), delivering it on time and to budget.

Of the participants, NERC, VMM-AK, FH, VMM-AWA and RIKZ are publicly funded national bodies. NTUA, ULg and UTH are Universities and Aquafin, DHI, WSL and WL Delft are non profit companies. All the partners have participated in many past and current EC projects. Much of their recent contribution has been underpinning research for the Water Framework Directive. VMM-AK and NTUA are representing the Pilot River Basins where the WFD is being trialled. The two most relevant projects are the FP5 HarmonIT and Interreg III Scaldit.

APPENDIX 2 TASK DELIVERABLES AND THEIR STATUS

The table below shows a detailed list of the Task deliverables and their status.

Task Deliverables and their status

Deliverable No	Deliverable title	Delivery date	Status
TaskA/1	Training material	**September 2009**	**Ongoing**
TaskA/2	Training course 1 on OpenMI concepts for end users	**December 2006**	**Completed**
TaskA/3	Training course 2 on OpenMI concepts for end users	**June 2008**	**Not started**
TaskA/4	Training course 1 on OpenMI upgrades for developers	**December 2006**	**Completed**
TaskA/5	Training course 2 on OpenMI upgrades for developers	**June 2008**	**Not started**
Task B/1	Defined Use Cases	**February 2007**	**Completed**
Task B/2	Models migrated to use the OpenMI Interface	**February 2007**	**Ongoing**
Task B/3	Evaluation report on integrated modelling using the OpenMI (from user and developer perspectives)	**September 2009**	**Not started**
Task B/4	Evaluation report on the OpenMI from a user perspective	**September 2009**	**Not started**
Task B/5	Evaluation report on the OpenMI support organisation from user perspective	**September 2009**	**Not started**
Task C/1	Defined Use Cases	**February 2007**	**Completed**
Task C/2	Models migrated to use the OpenMI Interface	**February 2007**	**Ongoing**
Task C/3	Evaluation report on integrated modelling using the OpenMI (from user and developer perspectives)	**September 2009**	**Not started**
Task C/4	Evaluation report on the OpenMI from a user perspective	**September 2009**	**Not started**
Task C/5	Evaluation report on the OpenMI support organisation from user perspective	**September 2009**	**Not started**
Task D/1	Management protocol report	**November 2006**	**Completed**
Task D/2	6-Monthly software releases of OpenMI upgrades	**Approx 6 monthly intervals**	**Ongoing**
Task D/3	6-Monthly document addenda	**Approx 6 monthly intervals**	**Ongoing**
Task D/4	Final documentation release of the updated OpenMI	**September 2009**	**Not started**
Task D/5	Evaluation report from OpenMI coordination perspective	**September 2009**	**Not started**
Task D/6	Maintained OpenMI website	**September 2009**	**Ongoing**
Task D/7	Business plan (Including After LIFE Communication report)	**September 2009**	**Started**
Task E/1	Best practice manual		**Not started**
Task E/2	Papers and Journals (6), e.g. Journal of HydroInformatics.		**Started**
Task E/3	Press articles (8)		**Not started**
Task E/4	Conference presentations (6), e.g. HydroInformatics and iEMSs		**Started**
Task E/5	OpenMI-Life web site (multi-lingual)		**Ongoing**
Task E/6	Workshops(5)		**Ongoing**
Task E/7	Associate with existing newsletters (3),e.g. Rivers List, IAHS, etc.		**Started**
Task E/8	Leaflets (4, multi-lingual)		**Started**
Task E/9	Posters (4)		**Started**
Task E/10	Layman's report		**Not started**
TaskF/1	The Collaboration Agreement	**December 2006**	**Completed**
TaskF/1	1st Progress Report to EC	**April 2007**	**Completed**
TaskF/2	2nd Progress Report to EC	**October 2007**	**Completed**
TaskF/3	3rd Progress Report to EC '(Mid-term Report')	**April 2008**	**Not started**
TaskF/4	4th Progress Report to EC	**October 2008**	**Not started**
TaskF/5	5th Progress Report to EC	**April 2009**	**Not started**
TaskF/6	6th Progress Report to EC '(Final Report')	**January 2010**	**Not started**
TaskF/7	Miscellaneous reports required by the EC	**As required**	**Not started**

APPENDIX 3 PARTNER INFORMATION

This Appendix provides names, addresses and contact details for all the personnel working in the partner organisations.

Organisation	Name And Address	Contact Details	Tasks A-F	Contract	Steering Committee	Technical Committee
Chairman CEH Wallingford, UK	Mr. Roger V. Moore CEH Wallingford Wallingford Oxon OX10 8BB. UK	Tel: +44 (0)1491 692235 Fax: +44 (0)1491 692424 Email: rvm@ceh.ac.uk	A, B, C, D, E, F	✓	✓	
Secretary CEH Wallingford, UK	Ms. Isabella Tindall CEH Wallingford Wallingford OX10 8BB. UK	Tel: +44 (0)1491 692205 Fax: +44 (0)1491 692424 Email: cit@ceh.ac.uk	A, B, C, D, E, F	✓	✓	
DHI Water and Environment, Denmark	Dr. Jan Gregersen representing DHI Water and Environment Agern Allé 11 DK-2950 Hørsholm Denmark Own company: LicTek, Tingstedet 8, DK-4070, Kirke Hyllinge, Denmark	Tel: +45 4640 3626 Fax: +45 4516 9292 Email: Gregersen@LicTek.dk	A, B, C, D, E, F	✓	✓	✓
WL | Delft Hydraulics, The Netherlands	Dr. Peter Gijsbers WLDelft Hydraulics P.O. Box 177 2600 MH Delft The Netherlands	Tel: +31 15 285 89 28 Fax: +31 15 285 85 82 Email: peter.gijsbers@wldelft.nl	D			✓
WL | Delft Hydraulics, The Netherlands	Mr. Jaco Stout WLDelft Hydraulics P.O. Box 177 2600 MH Delft The Netherlands	Tel: +31 15 285 87 63 Fax: +31 15 285 87 11 Email: jaco.stout@wldelft.nl	A, B, D, F	✓	✓	

Organisation	Name And Address	Contact Details	Tasks A-F	Contract	Steering Committee	Technical Committee
WL | Delft Hydraulics, The Netherlands	Mr Stef Hummel WLDelft Hydraulics P.O. Box 177 2600 MH Delft The Netherlands	Tel: +31 15 285 85 09 Fax: +31 15 285 85 82 Email: stef.hummel@wldelft.nl	D			✓
Wallingford Software Limited, HR Wallingford Group, UK	Mr. David Fortune Wallingford Software Ltd. Howbery Park Wallingford OX10 8BA. UK	Tel: +44 (0)1491 822297 Fax: +44 (0)1491 826392 Email: david.fortune@wallingfordsoftware.com	A, B, C, D, E, F		✓	✓
Wallingford Software Limited, HR Wallingford Group, UK	Mr. Rob Millington Wallingford Software Ltd. Howbery Park Wallingford OX10 8BA. UK	Tel: +44 (0)1491 822417 Fax: +44 (0)1491 826392 Email: rob.millington@wallingfordsoftware.com	A, B, C, D, E, F	✓	✓	
NTUA National Technical University of Athens, Greece *Pinios partner*	Ms. E. Douka National Technical University of Athens Department of Water Resources and Environment School of Civil Engineering Heroon Polytechniou 9, 15780 Zografou, Athens, Greece	Tel: +30-6932-421049	C	✓		
NTUA National Technical University of Athens, Greece *Pinios partner*	Dr. A. Efstratiades National Technical University of Athens Department of Water Resources and Environment School of Civil Engineering Heroon Polytechniou 9, 15780 Zografou, Athens, Greece	Tel: +30-210-772-2853	C	✓		
NTUA National Technical University of Athens, Greece *Pinios partner*	Ms. M. Kalliampakou National Technical University of Athens Department of Water Resources and Environment School of Civil Engineering Heroon Polytechniou 9,	Tel: +30-210-772-2884	A, C, E	✓		

Organisation	Name And Address	Contact Details	Tasks A-F	Contract	Steering Committee	Technical Committee
	15780 Zografou, Athens, Greece					
NTUA National Technical University of Athens, Greece *Pinios partner*	Mr. J. Liagouris National Technical University of Athens School of Electrical and Computer Engineering Heroon Polytechniou 9, 15780 Zografou,, Athens, Greece	Tel: +30-69720763553	C, E	✓		
NTUA National Technical University of Athens, Greece *Pinios partner*	Prof. M. Mimikou National Technical University of Athens Department of Water Resources and Environment School of Civil Engineering Heroon Polytechniou 9, 15780 Zografou, Athens, Greece	Tel: +30-210-772-2880	A, C, E	✓	✓	
NTUA National Technical University of Athens, Greece *Pinios partner*	Dr. E. Safiolea National Technical University of Athens Department of Water Resources and Environment School of Civil Engineering Heroon Polytechniou 9, 15780 Zografou, Athens, Greece	Tel: +30-210-7722885	A, C, E	✓	✓	
NTUA National Technical University of Athens, Greece *Pinios partner*	Mr. E. Sotiropoulos Online Media Manager Mediacube New media design & consulting Athens, Greece	Tel: +30 6937 213311	E	✓		

Organisation	Name And Address	Contact Details	Tasks A-F	Contract	Steering Committee	Technical Committee
NTUA National Technical University of Athens, Greece *Pinios partner*	Prof. A. Stamou National Technical University of Athens Department of Water Resources and Environment School of Civil Engineering Heroon Polytechniou 9, 15780 Zografou, Athens, Greece	Tel: +30-210-7722809	C	✓		
UTH University of Thessaly, Greece *Pinios partner*	Mr. Lampros Vasiliades Department of Civil Engineering University of Thessaly 38334 Volos Greece	Tel: +30 24210 74115 Fax: +30 24210 74169 Email: lvassil@uth.gr	C	✓		
UTH University of Thessaly, Greece *Pinios partner*	Mr.Pandelis Sidiropoulos Department of Civil Engineering University of Thessaly 38334 Volos Greece	Tel: +30 24210 74153 Fax: +30 24210 74169 Email:psidirop@uth.gr	C	✓		
UTH University of Thessaly, Greece *Pinios partner*	Dr. Konstantinos Kokkinos Department of Civil Engineering University of Thessaly 38334 Volos Greece	Tel: +30 24210 74115 Fax: +30 24210 74169 Email: k_kokkinos@teilar.gr	C	✓		
UTH University of Thessaly, Greece *Pinios partner*	Prof. Antonis Liakopoulos University of Thessaly Pedion Areos, 383 34 Volos, Greece	Tel. +30 2421 074111 Fax +30 2421 074169 Email: aliakop@uth.gr	C	✓	✓	
UTH University of Thessaly, Greece *Pinios partner*	Prof. Athanasios Loukas Department of Civil Engineering University of Thessaly 38334 Volos Greece	Tel: +30 24210 74168 Fax: +30 24210 74169 Email: aloukas@civ.uth.gr	C			
UTH University of Thessaly, Greece *Pinios partner*	Prof. Nikitas Mylopoulos Department of Civil Engineering University of Thessaly 38334 Volos Greece	Tel: +30 24210 74162 Fax: +30 24210 74169 Email: nikitas@civ.uth.gr	C			

Organisation	Name And Address	Contact Details	Tasks A-F	Contract	Steering Committee	Technical Committee
Aquafin Belgium	Mr. Johan Van Assel Aquafin Dijkstraat 8 2630 Aartselaar Belgium	Tel: +32 3 450 40 82 Fax: +32 3 450 44 44 Email: johan.vanassel @aquafin.be	A, B, C, D, E, F	✓	✓	
Aquafin Belgium	Mr. Chris Thoeye Aquafin Dijkstraat 8 2630 Aartselaar Belgium	Tel: +32 3 450 40 72 Fax: +32 3 450 44 44 Email: chris.thoeye@aquafin.be	A, B, C, D, E, F			
Aquafin Belgium	Gunther Waterschoot Aquafin Dijkstraat 8 2630 Aartselaar Belgium	Tel. +32 3 450 40 88 Fax +32 3 450 41 85 Email : gunther.waterschoot@aquafin.be	B			
VMM Vlaamse Milieumaatschappij Belgium *Scheldt partner*	Ir. Yves Ronse DVP Waterkwaliteitsmodellering VMM - Afdeling Kwaliteitsbeheer Werkadres : Gasthuisstraat 42, 9300 Aalst Postadres : A. Van de Maelestraat 96, 9320 Erembodegem	Tel : +32 53 72 66 31 Fax : +32 53 72 66 30 E-mail : y.ronse@vmm.be	A, B, D, E, F	✓	✓	
VMM Vlaamse Milieumaatschappij Belgium *Scheldt partner*	Mr. Tom D'Heygere DVP Waterkwaliteitsmodellering VMM - Afdeling Kwaliteitsbeheer Werkadres : Gasthuisstraat 42, 9300 Aalst Postadres : A. Van de Maelestraat 96, 9320 Erembodegem	Tel : + 32 53 726578 Fax : +32 53 72 66 30 E-mail: t.dheygere@vmm.be	A, B			
VMM Vlaamse Milieumaatschappij Belgium *Scheldt partner*	Mr. Gunther De Mey VMM - Afdeling Kwaliteitsbeheer Werkadres : Gasthuisstraat 42, 9300 Aalst Postadres : A. Van de Maelestraat 96, 9320 Erembodegem	Tel : + 32 53 72.63.26. Fax : + 32 53 72.62.31. Email : g.demey@vmm.be	B, E, F	✓	✓	
FH Flanders Hydraulic	Mr. Hans Vereecken Vlaamse Overheid - Departement	Tel: + 32 3 224 61 89 Fax: + 32 3 224 60 36	A3, B2,	✓	✓	

Organisation	Name And Address	Contact Details	Tasks A-F	Contract	Steering Committee	Technical Committee
Research Belgium *Scheldt partner*	Mobiliteit en Openbare Werken Afdeling Waterbouwkundig Laboratorium Berchemlei 115 | B-2140 Borgerhout	Email: hans.vereecken@mow.vlaanderen.be	B3, B4, E			
FH Flanders Hydraulic Research Belgium *Scheldt partner*	Mr. Peter Viaene Vlaamse Overheid - Departement Mobiliteit en Openbare Werken Afdeling Waterbouwkundig Laboratorium Berchemlei 115 | B-2140 Borgerhout	Tel: + 32 3 224 61 83 Fax: + 32 3 224 60 36 Email: peter.viaene@mow.vlaanderen.be	A3,B2, B3, B4, E			
FH Flanders Hydraulic Research Belgium *Scheldt partner*	Ms. Katrijn Holvoet Vlaamse Overheid - Departement Mobiliteit en Openbare Werken Afdeling Waterbouwkundig Laboratorium Berchemlei 115 | B-2140 Borgerhout	Tel: + 32 3 224 61 92 Fax: + 32 3 224 60 36 Email: katrijn.holvoet@mow.vlaanderen.be	A3, B2, B3, B4, E			
VMM Vlaamse Milieumaatschappij Afdeling Water Belgium *Scheldt partner*	Dhr. Kris Cauwenberghs Vlaamse Milieumaatschappij Afdeling Water Graaf de Ferraris-gebouw Koning Albert-II laan 20 1000 Brussel	Tel: +02 553 21 29 Fax: +02 553 21 05 Email: kris.cauwenberghs@lin.vlaanderen.be	A, B, E	✓	✓	
VMM Vlaamse Milieumaatschappij Afdeling Water Belgium *Scheldt partner*	Ms. Neel Devroede Vlaamse Milieumaatschappij Afdeling Water Waaistraat 1 bus2 3000 Leuven	Tel: + 32 16 21 12 60 Fax: + 32 16 211270 Email: neel.devroede@lin.vlaanderen.be	A, B, E			
ULG University of Liege Belgium *Scheldt partner*	Ir. Jean-Francois Deliege Centre de l'Environnement - Aquapôle : Sart Tilman B53 B - 4000 Liège (Belgium)	Tel: +32 (0) 4 366.23.56 Fax: +32(0) 4 366.23.55 Email: jfdeliege@ulg.ac.be	A3, A5, B1, B2, B3, B4, E1, E3, F1, F4	✓	✓	

Organisation	Name And Address	Contact Details	Tasks A-F	Contract	Steering Committee	Technical Committee
ULG University of Liege Belgium *Scheldt partner*	Ir. Joseph Smitz Centre de l'Environnement - Aquapôle : Sart Tilman B53 B - 4000 Liège (Belgium)	Tel: +32 (0) 4 366.23.54 Fax: +32(0) 4 366.23.55 Email: J.Smitz@ulg.ac.be	A3, A5, B1, B2, B3, B4, E1, E3, F1, F4	✓		
ULG University of Liege Belgium *Scheldt partner*	Mr Etienne Everbecq Centre de l'Environnement - Aquapôle : Sart Tilman B53 B - 4000 Liège (Belgium)	Tel : + 32 4 366.23.52 Email : e.everbecq@ulg.ac.be	A3, A5, B1, B2, B3, B4, E1, E3, F1, F4			
ULG University of Liege Belgium *Scheldt partner*	Mr Tayeb Bourouag Centre de l'Environnement - Aquapôle : Sart Tilman B53 B - 4000 Liège (Belgium)	Tel : + 32 4 366.23.56. Email : mbourouag@ulg.ac.be	A3, A5, B1, B2, B3, B4, E1, E3, F1, F4			
RIKZ National Institute for Coastal and Marine Management The Netherlands *Scheldt partner*	Mr. Edwin Spee RIKZ PO BOx 20907 2500 EX The Hague	Tel: +31 70 311 4261/ +31 640246742 Fax: + Email: Edwin.Spee@rws.nl	A3, A5, B4, E	✓	✓	
RIKZ National Institute for Coastal and Marine Management The Netherlands *Scheldt partner*	Mr. David Kerkhoven RIKZ PO BOx 20907 2500 EX The Hague	Tel: + Fax: + Email: David.Kerkhoven@rws.nl	A3, A5, B4, E			

APPENDIX 4 PUBLICATIONS

This Appendix lists scientific papers, conference papers, presentations, posters, leaflets and articles in the popular scientific press.

Authors	Date	Title	Event	Reference	Type
Fortune, D	17-19/4/2007	The relevance of the OpenMI to the Yangtze River Forum	Yangtze River Forum		Oral presentations
Moore, R. V., Tindall, C. I.	30/04/2007	OpenMI Progress Report. October 2006 – March 2007.			Customer Report to the European Commission. April 2007.
Moore, R. V., Tindall, C. I.	30/04/2007	Collaboration agreement for LIFE Project No LIFE06 ENV/UK.000409			Collaboration agreement
Vits, S. (VMM-AWA)	03/05/2007	Interaction between models: OpenMI-Life Project	Congress: Conference on Water Systems Symposium: Modelling for integrated water management in Flanders		Oral presentation
Van Assel, J	22/05/2007	OpenMI- Linking of InfoWorks CS and RS, applied in the Scheldt basin (in Dutch)	InfoWorks Benelux User meeting in Hoeven, The Netherlands.		Oral presentation
Safiolea E. (NTUA)	03/07/2007	Bringing the OpenMI to Life	Floodmed Workshop, Sofia, Bulgariaa		Poster Presentation
Aquafin	15/07/2007	Models co-operate better with OpenMI-Life (in Dutch)		Aqua Magazine 2007/02, Aquafin, Belgium	Promotional article
National Technical University of Athens and Centre for Ecology and Hydrology	31/07/2007	OpenMI-Life poster		Imprint: Athens, Greece: National Technical University of Athens, July 2002	Poster
Mylopoulos N. and P. Sidiropoulos (University of Thessaly)	9-13/09/2007	Uncertainty analysis and management in an overexploited aquifer	ModelCARE 2007 Calibration and Reliability in Groundwater Modelling, Credibility of Modelling, Copenhagen, Denmark		Poster presentation
Van Assel, J	12/09/2007	Integrated modelling in the Scheldt River Basin	InfoWorks International User Conference, Wallingford, UK		Oral presentation
Moore, R. V.	27/09/2007	Tools and technologies for river basin management, HarmonIT - OpenMI-Life	Harmoni-CA Final Conference, Brussels, Belgium		Oral presentation
Gregersen, J.B., Gijsbers, P.J.A., and Westen, S.J.P.	2007	OpenMI: Open modelling interface		Journal of Hydroinformatics, 9(3), 175-191.	Refereed paper
Hummel, S	03/10/2007	Presentation of OpenMI for IDSW”	IDsW-informative meeting on external		Oral presentation.

Authors	Date	Title	Event	Reference	Type
		(IDSW is the InformationDesk for Standards in the Water domain, the Netherlands)	developments.		
National Technical University of Athens and Centre for Ecology and Hydrology		OpenMI leaflet		Imprint: Athens, Greece: National Technical University of Athens, July 2007	Leaflet
Moore, R. V., Tindall, C. I.	31/10/2007	OpenMI second Progress Report. October 2006 – September 2007.			Customer Report to the European Commission. October 2007.
Devroede, N., Vits, S.	Written, but not yet published	Interacties tussen modellen: het OpenMI-LIFE project	Article for a Flemish magazine reporting on a presentation given by Vits S. on 03/05/2007. It describes the OpenMI-LIFE project and TaskB-the Scheldt in particular.		Article

Note: Publications in grey are in the process of being prepared.

APPENDIX 5 MEETINGS

This Appendix lists all the formal Meetings and Workshops held to manage and co-ordinate the work of the OpenMI-Life project.

Meeting	Date	Host / Venue	Attendees
OpenMI-Life kick-off meetings	**03-05/10/2006**	VMM-AK, Belgium	All partners
OpenMI Association Executive Committee meeting 2	**03/10/2006**	VMM-AK, Belgium	CEH, RIZA, WSL, NTUA, WL|Delft, DHI, NTUA, Aguafin,
Steering Committee meeting 1	**05/10/2006**	VMM-AK, Belgium	CEH, DHI, WL|Delft, WSL, NTUA, Aquafin, VMM-AK
Task B, Use case 'c' Technical meeting 1	**6/11/2006**	VMM-AWA Leuven, Belgium	Aquafin, VMM-AK, FH, VMM-AWA, ULG
Task B, Use case 'd' Technical meeting 1	**14/11/2006**	RIKZ Middelburg, The Netherlands	FH, RIKZ, WL|Delft
Task B, Use case 'c' Technical meeting 2	**23/11/2006**	VMM-AWA, Belgium	VMM-AK, ULG, VMM-AWA
Task A developers and end users training for Pinios	**30/10-01/11/2006**	NTUA, Greece	NTUA, UTH, DHI
Task A developers training for Scheldt	**29/11-01/12/2006**	ULG, Belgium	ULG, RIKZ, WL|Delft
Task B Technical meeting Use case 'b' and 'c'	**06/12/2006**	VMM-AWA, Belgium	VMM (+ULG), VMM-AWA, FH
Task B, Use case 'c' Technical meeting 3	**11/12/2006**	University of Liège, Belgium	VMM-AK, FH, ULG
OpenMI Association Technical Committee meeting 2	**13-14/12/2006**	WL | Delft, Delft, The Netherlands	DHI, WSL, WL|Delft, Alterra, RIZA
Task B Technical meeting ' b'	**17/01/2007**	VMM-AWA, Belgium	VMM-AWA, FH
Task A end users training for Scheldt	**17-19/01/2007**	VMM-AK, Belgium	VMM-AK, VMM-AWA, FH, ULG, Aquafin, WSL
OpenMI Association Technical Committee meeting 3	**22–23/01/2007**	WSL, Wallingford, UK	DHI, WSL, WL|Delft, Alterra
Steering Committee meeting 2	**25/01/2007**	CEH, Wallingford, UK	CEH, DHI, WL|Delft, WSL, NTUA, Aquafin, VMM-AK, HTSPE Ltd
OpenMI Association Dissemination Committee meeting 1	**16/02/2007**	NTUA, Athens, Greece	NTUA, CEH
Task B, Use case 'd' Technical meeting 2	**16/02/2007**	FH Borgerhout, Belgium	FH, RIKZ, WL|Delft
OpenMI Association Technical Committee meeting 4	**05-07/03/2007**	DHI, Hørsholm, Denmark	DHI, WSL, WL|Delft
Task B Technical meeting Use case 'a'	**05/03/2007**	VMM-AWA, Belgium	VMM-AWA, Aquafin
Task C Technical Group Meeting Pinios: All Use Cases	**05/03/2007**	University of Thessaly, Vols, Greece	NTUA, UTH
Task B, Use case 'c' Technical meeting 4	**6/03/2007**	University of Liège, Belgium	VMM-AK, ULG
Task C Technical Group Meeting Pinios : Use Case 3	**20/03/2007**	University of Thessaly, Volos, Greece	UTH
Task C Technical Group Meeting Pinios: Use Case 1	**28/03/2007**	NTUA, Athens, Greece	NTUA
Task C Technical Group Meeting Pinios: Use Case 2	**29/03/2007**	NTUA, Athens, Greece	NTUA
Task B, Use case 'c' Technical meeting 5	**29/03/2007**	University of Liège, Belgium	VMM-AK, ULG
Task C Technical Group Meeting Pinios: Use Case 3	**03/04/2007**	University of Thessaly, Greece	UTH
Task C Technical Group Meeting Pinios: Use Case 1	**12/04/2007**	NTUA, Athens, Greece	NTUA
Task C Technical Group Meeting Pinios: Use Case 2	**13/04/2007**	NTUA, Athens, Greece	NTUA
OpenMI Association Dissemination Committee meeting 2	**16/04/2007**	Aquafin, Aartselar, Belgium	NTUA, Aquafin, WL | Delft
Task B Technical meeting Use case 'a'	**17/04/2007**	Aquafin, Aartselar, Belgium	VMM-AWA, Aquafin, Wallingford Software

Meeting	Date	Host / Venue	Attendees
OpenMI Association Executive Committee meeting 3	**17/04/2007**	Aquafin, Aartselar, Belgium	CEH, RIZA, WL| Delft, DHI, WSL, NTUA, Aquafin, Alterra
OpenMI-Life Workshop	**18-19/04/2007**	Aquafin, Aartselar, Belgium	CEH, DHI, WL|Delft, HRWG, NTUA, UTH, Aquafin, VMM-AK, FH, VMM-AWA, ULG, RIKZ
OpenMI-Life Steering Committee meeting 3	**19/04/2007**	Aquafin, Aartselar, Belgium	CEH, DHI, WL|Delft, WSL, NTUA, Aquafin, VMM
OpenMI Association Technical Committee meeting 5	**07-09/05/2007**	WL | Delft, Delft, The Netherlands	DHI, WSL, WL|Delft
Task E Training and assistance on the OpenMI	**07-11/05/2007**	HEC, Davis, CA, USA	WL Delft, HEC
Task B, Use case 'd' Technical meeting 3	**08/05/2007**	WL | Delft, Delft, The Netherlands	FH, WL|Delft
Task C Technical Group Meeting Pinios: Use Case 3	**15/05/2007**	University of Thessaly, Volos, Greece	UTH
OpenMI Association Technical Committee meeting 6	**18-20/06/2007**	WSL, Wallingford, UK	DHI, WSL, WL|Delft
Task C Technical Group Meeting Pinios: Use Case 3	**04/07/2007**	University of Thessaly, Volos, Greece	UTH
Task C Technical Group Meeting Pinios: Use Case 2	**18/07/2007**	NTUA, Athens, Greece	NTUA
Task B Technical meeting Use case 'a'	**31/07/2007**	Aquafin, Aartselaar, Belgium	Aquafin, VMM-AWA
Task C Technical Group Meeting Pinios: Use Case 3	**30/08/2007**	University of Thessaly, Volos, Greece	UTH
OpenMI Association Technical committee meeting 7	**03-05/09/2007**	DHI, Hørsholm, Denmark	DHI, WSL, WL|Delft
OpenMI Association Executive Committee meeting 4	**06/09/2007**	DHI, Hørsholm, Denmark	CEH, RIZA, WL|Delft, DHI, WSL, NTUA, Aquafin, Alterra
OpenMI-Life Steering Committee meeting 4	**07/09/2007**	DHI, Hørsholm, Denmark	CEH, DHI, WL|Delft, WSL, NTUA, Aquafin, VMM
Task C Technical Group Meeting Pinios: Use Case 1	**19/09/2007**	NTUA, Athens, Greece	NTUA
Task B Technical meeting Use case 'a'	**24/09/2007**	Aquafin, Aartselaar, Belgium	Aquafin, VMM-AWA
Task B Technical meeting Use case 'b'	**24/09/2007**	FH, Borgerhout, Belgium	FH, VMM-AWA
OpenMI Association Executive Committee meeting 5	**03/10/2007**	WL | Delft, Delft, The Netherlands	RIZA, WL| Delft, DHI, WSL, NTUA, Aquafin, Alterra
OpenMI Association General Meeting 1	**04/10/2007**	WL | Delft, Delft, The Netherlands	CEH, RIZA, WL| Delft, DHI, WSL, NTUA, Aquafin
Task C Technical Group Meeting Pinios: Use Case 1	**10/10/2007**	NTUA, Athens, Greece	NTUA
Task B, Use case 'd' Technical meeting 4	**11/10/2007**	FH Borgerhout, Belgium	FH, RIKZ, WL|Delft
OpenMI Association Technical Committee meeting 8	**22-24/10/2007**	WL | Delft, Delft, The Netherlands	DHI, WSL, WL|Delft
Task C Technical Group Meeting Pinios: Use Case 1	**24/10/2007**	NTUA, Athens, Greece	NTUA
Task C Technical Group Meeting Pinios: Use Case 2	**25/10/2007**	NTUA, Athens, Greece	NTUA
OpenMI Association Documentation Meeting 1	**25/10/2007**	WL | Delft, Delft, The Netherlands	CEH, WL| Delft, DHI, WSL, Butford Technical Publishing
OpenMI Association Strategy meeting 1	**30-31/10/2007**	Brussels, Belgium	CEH, WL| Delft, DHI, WSL, Aquafin, NTUA, EC DG RTD
OpenMI Association Dissemination Committee meeting 3	**19/11/2007**	CEH, Wallingford, UK	CEH, NTUA, Aquafin, WL|Delft
2nd OpenMI-LIFE Workshop	**20/11/2007**	HRW, Wallingford, UK	All partners plus outside invited guests
OpenMI Association Workshop	**21/11/2007**	CEH, Wallingford, UK	All partners plus outside invited guests
OpenMI Association Strategy and Funding meeting 2	**21/11/2007**	CEH, Wallingford, UK	Partners plus outside invited guests
OpenMI Association Technical Committee meeting	**22/11/2007**	CEH, Wallingford, UK	Partners plus outside invited guests
Bilateral meetings with visitors Planning co-operations with visitors	**22/11/2007**	CEH, Wallingford, UK	Partners plus outside invited guests
OpenMI-Life Steering Committee meeting 5	**23/11/2007**	CEH, Wallingford, UK	CEH, DHI, WL|Delft, WSL, NTUA, Aquafin, VMM

Meeting	Date	Host / Venue	Attendees
OpenMI Association Executive Committee meeting 6	**23/11/2007**	CEH, Wallingford, UK	CEH, RIZA, WL| Delft, DHI, WSL, NTUA, Aquafin, Alterra
OpenMI Association Technical committee meeting 9	**10–12/12/2007**	WSL, Wallingford, UK	DHI, WSL, WL|Delft
Task B, Use case 'd' Technical meeting 5	**10/01/2008**	WL | Delft, Delft, The Netherlands	FH, RIKZ, WL|Delft