Bringing the OpenMI to LIFE

Interim Report
1st October 2006 – 31st March 2008

LIFE Grant Agreement Number
LIFE06 ENV/UK.000409

INTERIM REPORT

Reporting Date
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LIFE Project Name
Bringing the OpenMI to LIFE

Data Project

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KEYWORDS

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

ABBREVIATIONS

CEH	Centre for Ecology and Hydrology, a component body of NERC
Deltares	The new name for WL Delft
DHI	DHI – Water, Environment and Health
EC	European Commission
FH	Flanders Hydraulic Research
HarmonIT	The short name for the Framework 5 project called IT Frameworks
NERC	National Environmental Research Council, UK
OA	OpenMI Association
OADC	OpenMI Association Dissemination Committee
OAEC	OpenMI Association Executive Committee
OATC	OpenMI Association Technical Committee
OO	Object Orientated
OpenMI	Open Modelling Interface
RIKZ	National Institute for Coastal and Marine Management now Deltares
SDK	Software Development Kit
ULg	University of Liège
UTH	University of Thessaly
VMM	Vlaamse Milieumaatschappij

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[1] This does not include sub-contractors.

VMM-AWA	Intern Verzelfstandigd Agentschap Vlaamse Milieumaatschappij – afdeling Water
WFD	Water Framework Directive
WL|Delft	Delft Hydraulics now Deltares
WSL	Wallingford Software Ltd

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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 under operational conditions. 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 of OpenMI-Life are:
- Demonstrations and evaluations of the OpenMI under operational conditions in the Scheldt and Pinios basins
- The creation, demonstration and evaluation of a support organisation for the OpenMI
- Dissemination of information about the OpenMI

A detailed list may be found in Appendix 1 giving the status of each item.

1.3. SUMMARY OF THE FOLLOWING SECTIONS

In the report that follows, Sections 2 and 3 explain the objectives, approach and organisation of the project. These follow the proposal almost exactly. Section 4 describes the technical challenges that have arisen during the LIFE project as the OpenMI begins to be used more widely; it also explains how they are being met. In Section 5, there is a progress report on every activity completed or underway at the time of writing. With one minor exception, these are all on schedule and the results so far are encouraging. The project's dissemination activities are described in Section 6. These have been gratifyingly successful, especially in the US. The challenge here is to find the resources to follow up the interest. Section 7 reviews the achievements to date and concludes that, providing the project management stays focused, the project should achieve all its objectives. The 'After-LIFE communication plan' is already well developed, being, for this project, an important outcome. It will take the form of the OpenMI Association's strategy. Section 9 outlines the remaining work, which is believed to achievable by January 2010. Finally, Section 10 explains that the budget is under control. It is slightly under spent at present. This is partly due to the reorganisation affecting many partners and is partly an artefact of the accounting system. The key point is that the resources are available to complete the project.

SECTION 2.   INTRODUCTION

2.1. BACKGROUND AND OBJECTIVES

The project's rationale lies in the Water Framework Directive, which demands an integrated approach to water management. This requires an ability to predict how catchment processes will interact. 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 solution, the Open Modelling Interface and Environment, now referred to as the OpenMI.

The purpose of this project is to transform the OpenMI from research output to sustainable operational product. It will build the capacity to use the OpenMI and will demonstrate it in real-life situations. It will also demonstrate the technical support and co-ordination. Finally, information about the OpenMI will be disseminated to users.

The proposal's goal is to support the Directive's implementation by facilitating the integrated approach to water management, which the Directive requires.

2.2. PROJECT METHODOLOGY AND TECHNICAL SOLUTION

The work to achieve the objective has been broken down into six tasks:

A. **Build capacity:** This task is creating a core of modellers with OpenMI skills.

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. They contain problems whose management requires an integrated approach and hence the use of linked models. These problems are being used by the competent authority partners to evaluate the added value of integrated modelling and the OpenMI.

D. **Establish a technical support and co-ordination organisation:** The success of the OpenMI depends upon its widespread adoption at the European and global levels. However, it will only be taken up if there is confidence that it will be, supported and maintained into the future. This task is creating, demonstrating and evaluating a support organisation, the OpenMI Association.

E. **Disseminate information:** For widespread take up of the OpenMI to happen, the world needs to know about it. This task has identified the OpenMI user community, what it needs to know and the best way of communicating with it. The task is now actively promoting the OpenMI's use, with the focus of its work being in Europe and the US.

F. **Manage OpenMI-Life:** The transformation of an IT product is a complex task involving risk. Substantial time is therefore being allocated to project management.

2.3. EXPECTED ENVIRONMENTAL BENEFITS

The expected benefits of the OpenMI-Life project are:

- The creation of new generation of scientists, engineers and IT people, who understand integrated modelling and can apply the OpenMI, and the production of training material and training courses.
- Credible demonstrations in the Scheldt and Pinios showing whether or not the OpenMI will contribute to making integrated modelling and management feasible and from which will come:
  - o evaluation reports on:
    - integrated modelling
    - the OpenMI and its support
  - o models migrated to use the OpenMI Interface.
- An OpenMI technical support and co-ordination organisation for which there will be a) a prototype organisation, b) an evaluation report and c) a forward business plan in the form of the 'After LIFE Communication' report.
- A European user community informed at all levels from policy making to implementation on the value of integrated modelling in solving environmental problems through best practice manuals, journal and conference papers, popular press articles, web sites, newsletters, leaflets in the main languages, posters and the Layman's Report.

SECTION 3. LIFE-PROJECT FRAMEWORK

3.1. PROJECT METHODOLOGY

As described in Section 2.2, the project has been broken down into six separate but interdependent tasks, each with a number of activities. The main function of each task is to simulate an aspect of the use and support of the OpenMI under operational conditions. The simulation tasks are conducted as nearly as possible in the way that they would be under operational conditions.

Some elements of each task are not part of the simulation; for example, each part of the simulation has to be set up and evaluated. In the same way, the Dissemination Task (E) is thought of as being in two parts; dissemination activities that would be undertaken by the support organisation and therefore form part of the simulation and activities describing the OpenMI-Life LIFE Environment project itself, which are not part of the simulation. The management task (F) is similarly split.

The project phases and their linkages are shown in Figure 1, with the simulation activities highlighted.

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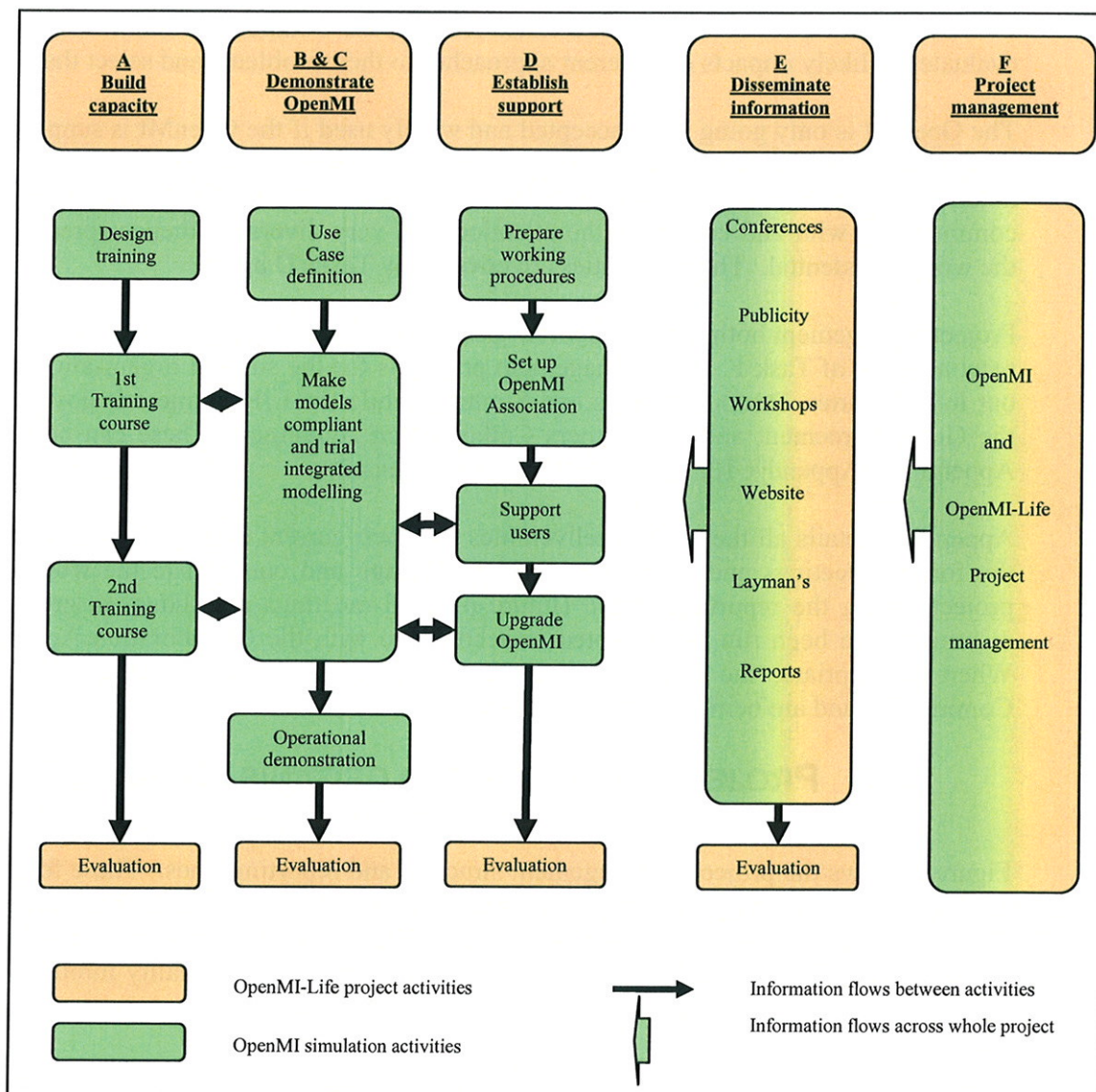
Figure 1 The OpenMI-Life Project Phases

To explain the simulation, the modelling process is driven by the Competent Authorities and their agents; they are charged with implementing the Water Framework Directive using an integrated approach to management. Tasks B and C represent their activities. Through the planning process or in response to events, they identify problems which require an integrated approach for their solution. Seven such problems are being addressed in OpenMI-Life and they are referred to as Use Cases; these use cases are located in the Scheldt (B) and Pinios river (C) basins. To solve the problems, the competent authorities define the problems and develop a plan – Use Case definition. The plan identifies, *inter alia,* the interacting processes to be modelled and the models best suited to represent the processes. The models are then obtained and, if not already OpenMI compliant, made so in order that they can be linked. At this point training and support may be required and it's the role of Tasks A and D to provide the necessary help. It may be that changes are needed to the models and, if so, the competent authorities and the model suppliers/developers will negotiate the changes. In turn, the developers may require a change to the OpenMI. If so they will make a request to the support organisation, now in existence and called the OpenMI Association, represented by Task

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D. Armed with a set of linkable and tested models, the Competent Authorities can now evaluate the likely impacts of different approaches to their problems and select the best.

The OpenMI is only going to be accepted and widely used if the OpenMI is supported by a credible organisation. This implies that it must have substantial, respected and determined backing, technical competence and a clear forward strategy. The ability to communicate with and command the attention of a very diverse audience spread across the world is essential. These activities are covered by Tasks D and E.

Project management both of the support organisation and the OpenMI-Life project are the responsibility of Task F. The management protocols for the support organisation are set out in its Charter, Standing Orders and Strategy, while the LIFE project is governed by the Grant Agreement and the partners Collaboration Agreement. These can be seen in Appendix 9, Appendix 10, Appendix 11and Appendix 12.

Appendix 1details all the project deliverables and their current status. Appendix 5shows the formal Meetings and Workshops held to manage and co-ordinate the work of the project during the reporting period (future planned meetings are shown in grey). All meetings have been run and minuted in accordance with the Collaboration Agreement. Where appropriate, the minutes were distributed to all partners and the European Commission and are being published on the website.

3.2. PROJECT PARTNERS AND ORGANISATION

Figure 2 shows the project's management structure and reporting lines. These follow the proposal except that responsibility for quality now lies with the task leaders, who are all Steering Committee members. Ultimate responsibility for quality rests with the chairman. By this change, it is hoped to propagate a culture of appropriate quality throughout the project.
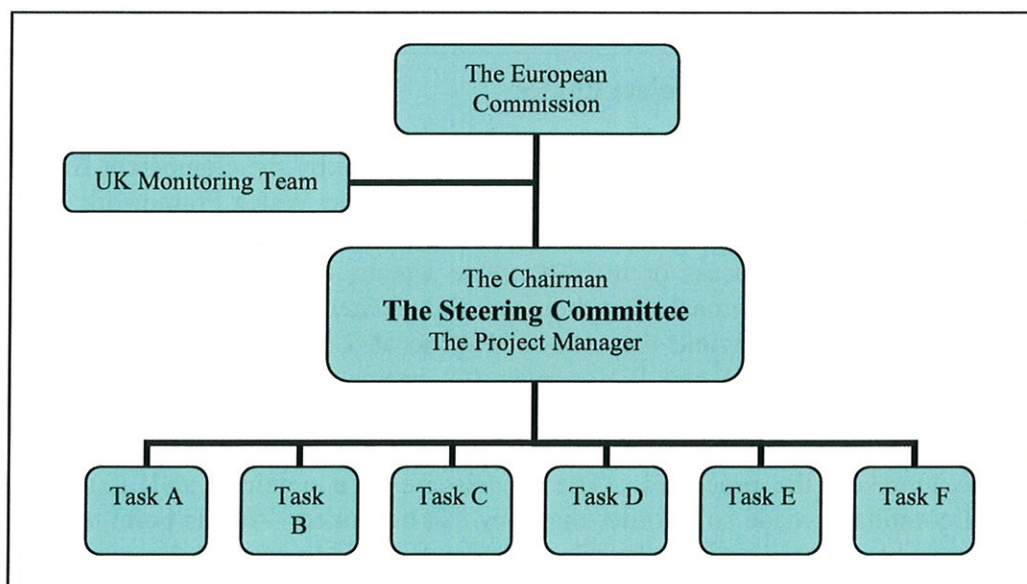

Figure 2 The structure and reporting lines of OpenMI-Life

It is the objective of the project to leave in place an operational support organisation to manage the continued development and support of the OpenMI. Over the duration of the

project, all activities relating to the support organisation will be mapped onto the new organisation's structure and run as though the new organisation is in place.

The formal inception of the OpenMI Association occurred in June 2007, and the above process is now going forward. The Association's structure is shown in Figure 3. Whilst the Steering Committee still overseas the whole LIFE project and the Scheldt and Pinios case studies, responsibility for Task D has effectively transferred to the Association's Technical Committee and Tasks A and E to the Association Dissemination Committee, with both being overseen by the Association's Executive Committee.
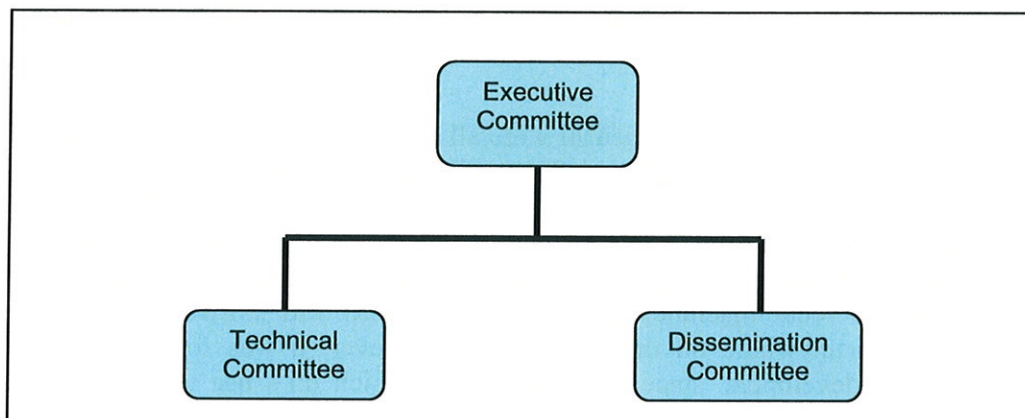

Figure 3 Organogram for the OpenMI Association

3.3. MODIFICATIONS TO PROJECT MANAGEMENT STRUCTURE

Whilst there have been no changes to the project management structure, during this project phase the project manager, Isabella Tindall, went on maternity leave. Her role is currently being covered by Hazel Murphy, who is also based at CEH Wallingford, UK. From January 1st 2008, WL|Delft and the part of the Dutch Directorate for Public Works and Water Management (Rijkswaterstaat - RIKZ) involved in the OpenMI-Life project merged into the new legal entity of Deltares. Despite this reorganisation, all staff on the project have remained the same, and there is still the same overall financial and resource commitment to the project. A contract modification creating a new partner Deltares with a short name of DELTA has been submitted to take effect from 01/01/2008. It has been agreed that WL Delft and RIKZ will cease to be partners from 31/12/2007, and all remaining finance from both partners will transfer to the new partner Deltares with effect from 01/01/2008. Appendix 3 lists, for each partner, the staff members involved in the OpenMI-Life project and their contact details. The University of Liege has also undergone major reorganisation.

SECTION 4. TECHNOLOGY

4.1. THE OPENMI STANDARD

The OpenMI was developed under the HarmonIT project and the first official release (version 1.0) took place in September 2005. At that time, the OpenMI was only being used by its originators. This is no longer the case. It is now being widely used by developers around the world, many of whom have no direct contact with the OpenMI

development group and are solely reliant on published documentation. This increase in the number of developers using the OpenMI has put new demands on the OpenMI Association as a standard provider. The most important, all of which have been addressed by the Association through the OpenMI-Life project, are:

- the need to provide a much tighter and unambiguous definition of the Standard
- the need to balance the conflicting demands for change and for stability
- the need to address change requests received from developers and users.

4.1.1.   Providing an accurate and unambiguous definition of the Standard

Versions 1.0, 1.1 and 1.2 of the OpenMI were all released as a downloadable installation file, which would install the compiled C# dll's for the OpenMI Standard and the supporting tools into the general assembly cache on the client computer. The process also copied all the associated source code and written documentation to the client computer as well. This procedure was convenient for many developers, since everything was then available on the local machine; the OpenMI Standard and software tools could be referenced from anywhere on that computer. However, it was found that this also confused some developers, since it was not clear which dll's use was obligatory and which dll's were only there to make the migration of models easier. The same problem applied to documentation, in that it was difficult to distinguish between recommendations and requirements.

At the same time, it became evident that the OpenMI could be defined at different levels and that it was important to choose one. A purely verb definition was possible, which would have the advantage of being independent of the operating and programming environment in which it was implemented. Alternatively, the interfaces could be defined in code, for example, c#. These and other issues have been addressed in the new OpenMI 1.4, which was released in December 2007.

Release 1.4 of the OpenMI standard contains only the definition of the OpenMI Standard interfaces (in code form) and associated documentation. The supporting tools and utilities are released as separate packages called the OpenMI Configuration Editor and the OpenMI SDK (software development kit). In order to avoid the possibility of creating conflicting definitions for the Standard, the textual specifications for the standard interfaces are given as comments embedded within the source code. This means that apart from the statement given in Appendix 6, the only documentation provided for the standard is the comments within the code.

The consequence of expressing the definition of the OpenMI interface in code form is that until version 2.0, there will be two definitions of OpenMI compliance. Components will be either OpenMI 1.4 C# compliant or OpenMI 1.4 Java compliant. The respective definitions will be found in the files ILinkableComponent.cs and ILinkableComponent.java. A fuller explantion of the OpenMI Standard is given in Appendix 6.

4.1.2.   Balance the conflicting demands of flexibility and stability.

Changing the OpenMI Standard has major implications for both OpenMI developers and users. Unfortunately, it is impossible to make such changes backward compatible. Consequently, when a new OpenMI Standard is released, all model providers must upgrade their models to stay compliant with the latest OpenMI version. The pace at which this happens varies from model provider to model provider, since many model providers only make new releases of their software products on a six month or yearly basis. Hence, after an OpenMI Standard release it can often take a year before the bulk of compliant models are upgraded to the new version. This has implications for OpenMI users, as they may find that the models they want to use for linked configurations are not compliant to the same OpenMI versions. For this reason a very conservative release strategy for the OpenMI Standard has been adopted. Of course this has to be balanced against the need to implement the change requests from developers and users. If the Standard stays unchanged for too long, variants of the standards will emerge. It is then unlikely that models compliant to such variants will be linkable to models that comply to the official OpenMI Standard, with the result that end users may find that there are supposedly OpenMI compliant models that cannot be linked.

It was realised with version 1.4 that there was a need to have a clear distinction between the OpenMI Standard and tools developed to aid the implementation of the OpenMI, for example, the SDK and the configuration user interface. This separation has enabled a balance to be obtained between the conflicting demands of flexibility and stability. Having a very clear Standard definition and one which has been reduced to the absolute minimum increases the chance that it can remain stable for longer. The tools can then evolve at whatever rate the developers feel is appropriate.

4.1.3.   Meeting the change requests from developers and users.

In parallel with the work on the 1.4 release, work is being carried out on the development of version 2 of the OpenMI Standard. As previously discussed, it has been agreed that the OpenMI Standard should not be changed too frequently; accordingly, a two year period between releases has been adopted.

The approach to developing the new version has been to review and prioritise the list of change requests. A cut-off point determined by the available resources has been defined. Those above the cut-off have been reformulated as use cases. These fall into four categories and will illustrated below.

a. **Changes to naming conventions and the adoption of new technologies**
When the OpenMI Standard version 1.0 was initially developed, the focus was on enabling data exchange between hydrological and hydraulic models. However, the OpenMI is now been used for many other types of applications including the exchange of data between models and databases and the exchange of data between models and web services. This means that the naming of properties, methods, and interfaces needs to be revisited. One simple example is the property *ModelID*, which

does not make sense if the OpenMI compliant component is a web service, and therefore it is being renamed as *InstanceID*.

New developments within the C# and Java programming languages have enabled the Standard to be defined in a way such that compliant models now have greater stability and better computational performance, for example, by the use of 'type safe collections'.

b. Enabling the exchange of complex data types

The OpenMI 1.0 Standard only supports the exchange of arrays of doubles. However, some models and data providers use other data types, for example, character variables with values such as "high", "medium", and "low". There is also a need to exchange a sequence of values from a time series as opposed to just individual values. The possible changes being evaluated are extending the list of supported and the use of a generic data type such as Object. In the latter case, the definition of the data type would be done by the model developers.

c. Making the standard easier to use and understand

The pull-driven architecture used in the OpenMI 1.0 is very powerful with respect to the exchange of data between models running with asynchronous time steps and different geometrical schematizations. However, when it comes to simpler configurations the pull-driven approach seems unnecessarily complex, and some people might decide not to use OpenMI for this reason. To address the problem, the ablity to allow 'put' as well as 'get' methods is currently being investigated with a view to possible inclusion within the OpenMI version 2.0.

d. Supporting new ways of using the OpenMI (DSS, GUI)

The release of OpenMI 1.0 was an important step forward with respect to facilitating exchange of data between models, especially between models from different suppliers or representing different domains. However, the focus was on the exchange mechanism and little attention could be given to the ergonomics (ease of use) of linking and running linked models. As a result, the users of the current linked systems have to use the individual user interfaces of the models to access the input and output data. This can be inconvenient, especially if the models have been developed by different providers and so have different styles of user interface. The current investigation should establish whether it is feasible to build a model by linking existing applications, hide their application interfaces and drive the linked model through its own interface

4.2. THE OPENMI SDK AND GUI

The OpenMI SDK 1.4 is based on the utilities, development support, and backbone libraries created for the previous release. The most significant change is the way that the SDK is distributed. In the previous releases, the libraries were made available as a full installation that would install the compiled dll's into the general assembly folder on the local PC. In contrast,the 1.4 release simply comprised a zip file containing the C# source code. This means that developers using the SDK must compile the source code and install the resulting dll's on the end user's computers alongside the OpenMI compliant models. This new way of distributing the SDK gives the developers a small amount of extra work but has a number benefits. Firstly, since the SDK now is compiled and distributed by the model provider, it is clearer both to the end users and the model providers that the responsibility for the OpenMI compliant component belongs to the

component provider. Secondly, by separating the standard from the SDK, the problems that had been previously experienced with incompatibilities between OpenMI components using different versions of the SDK have been eliminated. Components compliant to the same version of the OpenMI Standard should now be compatible.

The OpenMI GUI, now called the OpenMI configuration editor, is distributed as a normal windows application, which can be downloaded and installed by the end users, if they wish to use it.

SECTION 5.   PROGRESS AND RESULTS

Please note: Task E, Disseminate Information is covered in SECTION 6 Dissemination activities and deliverables task ..

5.1.1.   Task A – Build Capacity

5.1.1.1.   Design and plan training

The purpose of Task A is to prepare and deliver two training sessions. The first was held early in the project to provide the project partners with a short introduction to the OpenMI, and was largely based on the experiences gained from the training given in the final phase of the HarmonIT project. The second set of training is scheduled to be held later in 2008. The main objective will be to provide the partners with information about further technical developments (both the recent release v1.4 and the planned future release v2.0), and to enable more people from the partners and/or associated organisations to become involved in using the OpenMI. All partners were contacted at the beginning of 2008 regarding their expectations for the structure and content of this second set of training sessions. The more detailed description given of Task A activities in Sections 5.1.1.2 to 5.1.1.5, therefore only refers to the first set of training sessions. All training material from theses sessions is available on the OpenMI-Life website.

5.1.1.2.   Provide End User training in setting up the OpenMI, OpenMI concepts and Use Cases

It had been anticipated that specific end user training would be required for the partners representing the modelling communities of both the Scheldt and the Pinios basin. However, because in the Pinios consortium there is a much closer relationship and greater collaboration between the model developers and the model users, combined developer and end user training was seen as more appropriate (see 5.1.1.4 and 5.1.1.5), whilst for the Scheldt basin, the two audiences were quite distinct. For the Scheldt partners, a dedicated End User training course was prepared by Wallingford Software, which built on their experience with prototype demonstrations from the HarmonIT project. The training focussed on the general principles of the OpenMI and the functionality of the OpenMI Configuration Editor, using examples and implementations from the InfoWorks software suite.

5.1.1.3.   Attend End User training in setting up the OpenMI, OpenMI concepts and Use Cases

The End User training course was attended by most of the Scheldt partners (VMM-AK, VMM-AWA, Aquafin, FH and ULg). It took place in Aalst (Belgium) at VMM's offices from 17th to 19th January 2007. The training was felt to have covered the right level of content, containing both introductory information and hands-on exercises. It gave the partners sufficient information to start using the OpenMI in their respective use cases. Based upon the participants' evaluations, the main problem appeared to be that exercises

were mostly built around specific software (in this case the InfoWorks suite), which was not necessarily known by all the participants, hence the need for more generic examples was expressed. This point is being taken into account in the planning of the second training round.

5.1.1.4.   Provide training to Developers in OpenMI upgrades

Developers' training was provided by DHI (for the Pinios) and WL|Delft (for the Scheldt partners), and comprised an introduction to the OpenMI Standard and a set of hands-on exercises to guide participants through the code migration process. The training assumed that participants were familiar with the principles of Object Oriented (OO) Programming.

5.1.1.5.   Attend training for Developers in OpenMI upgrades

The training for the Pinios partners was held in Athens (Greece) from 30th October to 1st November 2006 and was attended by NTUA and UTH. The training for the Scheldt partners was held in Liege (Belgium) from 29th November and 1st December 2006. It was also attended by ULG and RIKZ. Overall the training was felt to give sufficient information to allow the partners to start the migration process on their own. Arrangements were made to ensure that more specific problems arising during the migration process could be communicated properly through the OpenMI Association support facilities. For some participants, it appeared that a lack of knowledge of OO programming caused problems with keeping up with the training material. As this is likely to be a frequent problem for Fortran programmers, the point will definitely be addressed in any future sessions.

5.1.2.   Task B - Demonstrate the OpenMI in the Scheldt Basin

From here on the reader will find the possibly unfamiliar term 'use case' occurring regularly. It simply means 'an example of use' or more specifically in this report, the subject of a demonstration.

Task B consists of four Use Cases, each of which will demonstrate the use of the OpenMI in a particular integrated modelling context. Each demonstration has been broken-down into the following tasks: prepare use case definition, trial integrated modelling, demonstration and evaluation.

5.1.2.1.   Prepare Use Case definitions

The definitions of the four Scheldt use cases were completed during the first six months of the project. Each contains a full description of both the conceptual and technical issues that need to be tested and/or resolved together with a work plan.

- Use Case 'a' involves linking an InfoworksCS sewer flow model to a InfoworksRS river flow model of the River Dijle in the drainage area of the town of Leuven.
- Use Case 'b' involves linking a MIKE11 river flow model of the (tidal) downstream Dijle to an InfoworksRS river flow model of the upstream Dijle.
- Use Case 'c' involves linking an InfoworksRS and MIKE11 river flow model of the River Dijle to the PEGASE river quality model of the Dijle and Demer catchment.
- Use Case 'd' involves linking a MIKE11 1D river flow model of the River Dender to a Delft3D 2D estuary model of the Western Scheldt and to a Waqua 2D estuary and coastal model of the Western Scheldt and North Sea coastal zone.

5.1.2.2.   Trial integrated modelling

No migration had to be done for the use cases A and B except where minor adjustments and optimization of the OpenMI technology were required. For Use Case C, the ULg PEGASE model still needs to be made OpenMI compliant. So far, the PEGASE model has been migrated from UNIX to WINDOWS. For more information regarding the issues for Use Case C, please see Section 5.2 of this report. For Use Case D, the Waqua model of the Kustzuid and the Delft3D model of the Zeekennis were made OpenMI compliant by RIKZ.

The integrated modelling trial period for the use cases A, B and D has now run for twelve months, with a total scheduled duration of eighteen months. A number of issues, described in the Use Case Definition reports, have already been successfully trialled. The following models have been successfully linked:

- in Use Case A: the Infoworks RS model of the river Dijle and the Infoworks CS model of the sewerage system at the city of Leuven;
- in Use Case B: the Infoworks RS model of the upstream river Dijle and the MIKE11 model of the downstream river Dijle;
- in Use Case D: the Delft3D model of the Zeekennis and the MIKE11 model of the river Dender.

A number of Use Case trials are still awaiting minor modifications to the OpenMI implementation of InfoWorks, MIKE11 and Delft3D, but these are all well under control, and are being followed up in regular technical meetings. The only Use Case that is not on schedule is Use Case C. The problems and the actions taken to remedy them are described in Section 5.2.

5.1.2.3.   Demonstrate under operational conditions

This will take place in the second half of the project. The original plan is still seen as achievable for all Use Cases except Use Case C - see Section 5.2.

5.1.2.4.   Evaluate operational use

This is will be undertaken at the end of the project. However, some initial evaluations following model linking using the OpenMI already have been made, the lessons learned noted and recorded for inclusion in the final report. An example finding is the need to reconcile modelling approaches when undertaking integrated modelling. For example, it is relatively easy to link a sewer model and a river model. However, river modellers explore a rivers capacity to pass floods by simulating flows over long periods of time, may be a 100 years. They then examine the frequency with which various levels and flows are exceeded. Sewer modellers examine the sewer systems ability to handle extreme rainfall events or 'design' storms. Hence an exercise to examine the impact of sewers flows on river flooding must first reconcile these two different approaches.

5.1.3.   Task C - Demonstrate the OpenMI in the Pinios

The sustainability of the natural and built environment of the Thessaly Water District depends greatly on the water quantity and quality of the Pinios River. The three Use Cases for Task C use the OpenMI standard to facilitate the integration of in-house models with suitable commercially available OpenMI compliant models, so that the hydrologic and hydraulic processes and their interactions in the Pinios sub basins can be simulated.

5.1.3.1. Prepare Use Case definitions

During the first period of the project, the Use Case definition reports were written. For consistency, the Scheldt (Task B) and Pinios (Task C) partners both adopted the same Use Case definition structure to address the identification of critical study parameters, spatial and boundary limitations, and implementation obstacles. Each Use Case within Task C focuses on a different water management issue. In summary, the following problems are being investigated:

- Use Case 1 involves the linking of two NTUA models, a hydraulic model (RISH-1D) and a water quality model (R-Qual) with a MIKE-11 (the Rainfall-Runoff Module) to evaluate water quality upstream of Pinios junction with Enippeas tributary.

- Use Case 2 links a MIKE-11 model with an NTUA reservoir water management model (RMM-NTUA) to assess the impact of climate change on the reliability of the Smokovo reservoir (SW area of the Thessaly plain).

- Use Case 3 demonstrates the capabilities of the OpenMI by coupling the UTHBAL monthly conceptual water balance model [Loukas et al., 2008] with the Visual Modflow© groundwater model for the simulation of the overexploited Lake Karla aquifer in the hydro ecologically sensitive region of eastern Thessaly, Greece.

5.1.3.2. Trial integrated modelling

In November 2006, NTUA and UTH developers and end users received a three day combined developer and end-user training course and the necessary documentation to enable them to begin the model migration required for the project. The four in-house models that had to be migrated had been written in Delphi, FORTRAN, and Matlab. Currently, three out of the four models are OpenMI compliant, whilst the migration of the fourth model, R-Qual is in progress. With regard to the RMM-NTUA and the RISH-1D models, the engine cores were transformed to Dynamic Link Libraries (.dll), .NET assemblies were created for the wrapper classes and for the testing classes, and finally the models were tested using the NUnit framework. In the OpenMI Editor, each model was linked to the compliant example provided by the Technical Committee, the Simple River, to check that they could exchange all the information required for the OpenMI. The RMM-NTUA model has now also been upgraded to the latest version of the OpenMI, 1.4.

In order to assess the surface water and groundwater recharge in the aquifer of Lake Karla watershed, a Visual Studio.NET C# IDE version of the UTHBAL model has been developed [Loukas et al., 2008]. The UTHBAL framework consists of four basic components: (a) the data incorporation module, (b) the graphics module, (c) the optimization-verification module and (d) the migration module. These modules have been converted to independent dynamic link libraries (dll's) to make them portable and externally executable. A semiautomatic approach has been used for the creation of the OpenMI wrapper engine. The user was asked to identify the preferred hydrologic components to be exchanged during the interaction process by creating various .omi files. The migration process for these .omi files for both specific case studies and the UTHBAL model communication with a groundwater model has been verified using the NUnit Testing framework.

In all Task C Use Cases, the OpenMI has been used to support the integrated modelling requirements of the EU Water Framework Directive. The migrated models have been run separately and in linked mode, to check that the results matched and the linked runs were executed in a timely manner. The Use Case 1 and Use Case 2 models were calibrated and validated using data from the periods 1993-1996 and 2002-2007 respectively. The Use

Case 1 coupling of the MIKE11-NAM module to the RISH-1D model provided the river flow and stage at different cross sections along Pinios under different flow conditions. Whilst in Use Case 2, extreme scenarios of +/- 10% rainfall were analyzed to investigate whether rainfall fluctuations would change the operating rules of the reservoir. In Use Case 3, the OpenMI was used to simulate current surface water and groundwater resources and to predict the future response of the aquifer under various management schemes [Kokkinos et al., 2008]. The OpenMI has also been used in the integrated analysis of the response of the aquifer using hypothetical scenarios based on a scheduled reservoir operation for the partial restoration of Lake Karla. The management scenarios were basically linked to the expected surface reservoir operation and the subsequent decrease of pumped water. Thus, scenarios dealing with water saving in the agricultural sector were examined. The improvements predicted by this pumping decrease (concerning both pumping rate and number of wells) were evaluated with respect to the aquifer's rehabilitation.

So far, some initial testing and trial running has been undertaken. For the Task C models, their study area, size and information exchange between, the linked runs have produced similar results and run times. The added value of using the OpenMI in Use Cases C2, and C3, which have progressed further, is obvious. In typical water management models, reservoir releases are demand driven and so ignore the time taken for water to travel downstream and become available. Linking reservoir and hydrological models ensures a more faithful representation of the hydro system operation, especially when decisions to abstract water are dependent on the interactions between surface and groundwater flows. A further typical example of where integrated management (and hence modelling) is beneficial occurs when the inflows to a reservoir are significantly reduced by upstream abstractions; in this case, simultaneous modelling is required to assess the impacts of abstractions on the reservoir yield. For Task C3, the scenarios examined can be constructed more easily using the OpenMI as compared with using off-line applications. The OpenMI standard and associated tools and utilities have proved to be an attractive, effective and fast means for model providers and model users to create scenarios, systems and policies for integrated catchment management [Kokkinos et al., 2008].

5.1.3.3.   Demonstrate under operational conditions

This activity is scheduled for the second part of the project, but the original plan is still seen as achievable.

5.1.3.4.   Evaluate operational use

This is scheduled for the second part of the project. However, an initial evaluation has been made and is reported above.

5.1.4.   Task D - Demonstrate the OpenMI technical support, maintenance and co-ordination

5.1.4.1.   Prepare working procedures and co-ordination protocols

The development and maintenance of an IT-standard requires very different procedures compared to an ordinary software product. Consequently, different procedures have been developed for the OpenMI Standard and from those for the OpenMI SDK (software development kit). It is technically difficult to make new versions of the Standard backwards compatible. Hence, any changes to the Standard will have huge implications for people using OpenMI compliant models, because models compliant to different versions of the OpenMI standard cannot be linked. This then undermines the very

purpose of OpenMI, the ability to create linked systems. However, the SDK, which is a set of software libraries that may or may not be used by developers when creating OpenMI compliant models, is an ordinary software product. Models developed using different versions of the SDK can be seamlessly linked as long as they are compliant to the same version of the OpenMI Standard. So, in order to find an optimal solution for the conflicting demands of flexibility and stability very strict procedures apply for the OpenMI Standard, whereas the SDK can be developed more freely.

It is anticipated that new versions of the OpenMI Standard will be released every two years, whereas new versions of the OpenMI SDK will be released annually, with minor updates (new features and bug-fixes) released every six months. The OpenMI Standard must be made available for public review and commenting for a period of time prior to the final release, and the final release version must be accepted for release by the OpenMI Association Executive Committee (OAEC). The SDK may be released by the OATC (OpenMI Association Technical Committee), without any supervision by the OAEC. Both the OpenMI Standard and the SDK follow the same procedures for version control, coding standards, documentation standards, and test procedures. Bug reporting, feature requests, change requests, and support is handled by the OpenMI Association Technical Committee through the public internet forum at www.sf.net/projects/OpenMI. These forums are also used within the LIFE project as the main means for technical communication between the OATC and the people working on the operational Use Cases. A draft version of theses procedures has been completed, and these procedures will be subject to further refinements during the coming year.

5.1.4.2. Set up and manage a sustainable coordination organisation

The OpenMI Association was officially established as a legal entity registered in the Netherlands on the June 4th 2007 and its first general assembly was held in Delft (NL) on October 4th 2007. The rules of the Association are defined in the Association's Charter and Standing Orders. The Association is managed through an Executive Committee. Two sub committees have been established; the OpenMI Association Dissemination Committee and the OpenMI Association Technical Committee. The Dissemination Committee is responsible for the OpenMI web site and all other dissemination activities and the Technical Committee is responsible for maintenance and development of the OpenMI Standard and the OpenMI SDK.

5.1.4.3. Periodically release OpenMI upgrades and evaluate protocols

Since the start of the OpenMI-Life project, the OpenMI Association Technical Committee has been working on two parallel tracks; the refinement of the OpenMI 1.0 release, developed by the HarmonIT project, and the development of the OpenMI 2.0 Standard and SDK. With regard to the OpenMI 1.0 track; there have been two key issues, performance testing, and the OpenMI 1.4 release.

Performance testing has been required as the OpenMI-Life Use Cases involve the linking of full scale models, which require the OpenMI to exchange relatively large amounts of data. Some of these models were written in FORTRAN or Pascal and require a C# wrapper to be written to make them OpenMI compliant. This combination of FORTRAN code (technically characterized as unmanaged code) and C# code (technically characterized as managed code) does not allow the passing of references but requires data being passed between models to be copied into memory. This could potentially lead to an unacceptable performance problem. To investigate this issue, two test models were

developed and a large number of different configurations were tested. For typical cases the performance impact due to the data exchange was below 3% of the total computational time. Even for extreme cases the performance impact did not exceed 13%. Hence, although performance is still an issue with respect to the OpenMI version 2 developments, no immediate action is required to enable the LIFE Use Cases to be completed.

The OpenMI 1.4 standard and SDK were released on December 20th 2007. The main purpose of this release was to solve incompatibility problems between models compliant to various OpenMI versions (1.0, 1.1, and 1.2). With effect from OpenMI version 1.4, the Standard was separated from the SDK and responsibility for the deployment of the SDK shifted to the model providers. This ensures that any component compliant to a specific OpenMI Standard version can be linked to another component compliant to the same OpenMI version regardless of which SDK version is used. In order to enable model providers to take control of the SDK, the OpenMI source license for the SDK was changed from LGPL to the new BSD license. The OpenMI 1.4 Standard release also includes a full Standard definition for Java. However, the SDK is still only provided for C#. The documentation defining the OpenMI Standard was made more precise, with ambiguities being removed and rules for the implementation of each method in the standard interfaces being defined as in-code comments. The printed documentation for OpenMI 1.0 had consisted of more than 200 pages. This had made it difficult for OpenMI developers and users to find the relevant pages. In order to resolve these problems, key documents targeted at either developers or end users were updated and organized on the OpenMI WIKI (wiki.OpenMI.org) under the heading "Getting started with OpenMI 1.4". This will enable users and developers to find relevant information more easily.

A comprehensive requirement analysis has been carried out in order to define the functionality required for the OpenMI 2.0. The major sources of information for the analysis have been the OpenMI-Life Use Cases, additional Use Cases posted on the OpenMI wiki, and feature requests posted by OpenMI users from around the World on the OpenMI SourceForge site. There are two main improvements for version 2, firstly, the ability to build complete decision support systems using OpenMI compliant models and components, and secondly, the ability to use OpenMI compliant models in connection with forecasting systems, generic calibration, optimization and data assimilation systems. The OpenMI 2.0 release should also enable the exchange of complex data types, such as categorized data and full time series. Considerable effort has also been put into making the OpenMI architecture easier to understand for system and model developers. The first prototype of OpenMI 2.0 was completed in February 2008. The first draft of the complete OpenMI 2.0 architecture and associated implementation is scheduled to be ready by August 2008.

5.1.4.4.   Maintain the OpenMI web sites

The OpenMI Association web site, www.openmi.org is the main entry point for people interested in OpenMI and is therefore considered the primary method of dissemination. It was therefore important to make sure that the site has a modern and professional appearance, and provides up to date information in a clear way that is targeted towards different audience types. Consequently, the web site was totally redesigned during the last six months of 2007, and a new website was released in January 2008. The new web site provides the latest news about activities in the OpenMI Association and the OpenMI community. There are different entries for developers and users, which make it easier to find information relevant to each audience. The site also provides information about

OpenMI services, OpenMI compliant models, training courses. Although this site is still been developed, the feedback received so far has been very positive. It is also clear that people are using the website to find out more about OpenMI events, and that this is having a cascade effect in terms of interest in collaboration projects. The announcement of the EU-NSF workshop has prompted several queries from other parties, and a very successful meeting with the Dutch TNO organisation was arranged because they saw the team was in Delft, The Netherlands that week.

During the spring of 2007 an OpenMI wiki was established. (Wiki.OpenMI.org). The wiki allows OpenMI developers to edit and add pages directly. This means that the wiki can evolve very quickly as new ideas develop. OpenMI design patterns and 'how-to' pages are added and edited on a daily basis. Since there is no formal quality control, the wiki is primarily a medium for internal OpenMI Association use. However, the Technical Committee finds it a very useful medium for more informal communication with software developers world wide. From time to time pages that are considered important and of wide interest are quality assured and moved to the official OpenMI website, www.openmi.org .

The OpenMI Open Source source code is made available through the SourceForge web site, www.sf.net/projects/OpenMI. This site also offers facilities for bug reporting, help forums, and feature requests. It is hoped that these three web sites cater for the varying needs of the different OpenMI users, whether they are seeking or offering information.

The OpenMI Life partners involved in the Use Cases are asked to interact with the OpenMI Association through these web sites rather than though direct contact, in order to test the web sites' ability to act as a communication channel between the OpenMI Association and the wider OpenMI community.

5.1.5.   Task F - Manage OpenMI-Life

5.1.5.1.   Prepare and agree a collaboration agreement

In accordance with Article 4.7 of the Common Provisions, the partners have prepared and signed a Collaboration Agreement. This supplements the Special and Common Provisions of the Grant Agreement and sets out how the project is to be conducted and the rights, roles and responsibilities of the Parties involved. In particular, it specifies: definitions, the purpose and duration of the project, the Coordinator' duties and responsibilities, the Steering Committee's duties and responsibilities, the responsibilities of Task leaders, the responsibilities of each Party, costs, travel and subsistence, confidentiality, liabilities, Force Majeure, intellectual property rights and property, access, publications, press releases and reports to the Commission, assignment, termination, settlement of disputes, language, notices, applicable law, amendments and no partnership or agency. A complete copy of the text may be found in Appendix 12.

5.1.5.2.   Chair and support the Steering Committee

Steering Committee meetings have been held at quarterly intervals rotating around project partner sites. The OpenMI-Life Steering Committee is made up of the Task Leaders, the Project Coordinator and the Project Manager and its function is to actively manage the project.

Prior to each meeting task leaders send in a task progress report. The main work of the Steering Committee is then to review progress against the project plan, identify and manage any problems and plan ahead. The Steering Committee also provides an

opportunity for maintaining personal communication between the project leaders, something which is essential in all projects but particularly one where the participants are spread across many countries.

All meetings are chaired by the Project Coordinator and minuted by the Project Manager. The minutes are distributed to all participants and the EC's representatives. Each member has a nominated deputy but the need for deputies has been minimal so far. To date, the Steering Committee has worked as a very effective, mutually supportive group.

5.1.5.3.   Manage tasks

Responsibility for the management and execution of tasks is delegated by the Steering Committee to the Task Leaders, who in turn can delegate the management of specific activities to an Activity Leader. Hence, whilst the Project Coordinator with the support of the Project Manager has overall responsibility for the project, it is the Task Leader's responsibility to ensure that their activities are being managed satisfactorily and that project deliverables are being achieved. Task Leaders are expected to notify the Project Manager of any issues that could cause problems as early as possible to ensure that remedial action is taken quickly.

The approach has so far worked well. Between meetings, the project manager is in regular contact with the task leaders. Only two significant unforeseen management problems have arisen. CEH is in the process of reorganising, which caused some uncertainties at the outset of the project but did not impact its progress. The University of Liege reported in late 2007 that the University department involved was also undergoing major reorganisation, with the result that their work would be delayed. The Coordinator went to Liege immediately and reviewed the situation. Following the meeting, a revised work plan was put in place. Support and training for the new staff that Liege will bring in is being offered by the other partners.

5.1.5.4.   Report to the EC

Copies of all approved Steering Committee minutes have been sent to the EC representatives by the Project Manager, so that they are aware of the project's progress and any issues that have arisen. Informal telephone and email contact is also maintained with the EC representatives, who have been very helpful and supportive. Six monthly progress reports are written by the Project Manager with input from the Project Coordinator and all Task Leaders. These reports include summary financial information detailing project expenditure to date as a percentage of the total predicted project spend. These reports are written according to the EC LIFE project management guidelines, and contain progress for the six month period prior to submission.

5.1.5.5.   Represent the project at EC Co-ordination meetings

No requests have been made to represent the project at EC Co-ordination meetings.

5.2. CONSEQUENCES OF PROBLEMS AND DELAYS

The only significant concern within the project at the moment relates to Task B, Use Case C. The problem has two causes. Firstly, it was not fully appreciated at the proposal stage that that the PEGASE model was UNIX rather Windows based. There was therefore a non-trivial additional task of converting it to the Windows platform to be completed before work could start on making it OpenMI compliant. The complexity of the system being modelled and the geographic mismatch between the models being linked added to the difficulty. However, these latter problems are exactly the type of issues that the

OpenMI-Life project was designed to identify and address and their solution is the proper business of the project..

The second problem that has arisen at the University of Liege (ULG) is due to reorganisation in the participating department at the end of the 2007, resulting in some of the work by ULG being suspended. As explained above, the Steering Committee and the Task B leader, supported by Deltares, are working with Liege to help them recover the situation.

The proposed solution is as follows. Firstly, ULG will recruit a new member of staff, who will work full-time on the project. An information specialist familiar with both the UNIX and Windows environments will be allocated to help with model linking and testing the linked models, once the models have all been made OpenMI compliant. The current Use Case definition report has been reviewed and a new work schedule has been prepared so that the Use Case is completed on time. This new plan is given in Appendix 8.

SECTION 6.   DISSEMINATION ACTIVITIES AND DELIVERABLES TASK E

6.1. DISSEMINATION PLAN

The objectives of the OpenMI-Life dissemination activities at the start of the project were to plan and implement a dissemination programme that would 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 required 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 has been split into two parts. The first covers the dissemination of information about the OpenMI-Life project, and has been guided by the OpenMI-Life Steering Committee, while the second has a broader scope and covers the overall dissemination of the Open Modelling Interface standard. With the formation of the OpenMI Association this second part is now being undertaken by the OpenMI Association Dissemination Committee.

The following sections will describe the dissemination activities to date.

6.2. DISSEMINATION ACTIVITIES

The OpenMI Association has recently adopted as its vision, 'a future where integrated modelling is an accepted tool for resolving integrated management problems.' Clearly, dissemination has a very important part in the realisation of this vision. However, it is unlikely to be achieved within the duration of the OpenMI-Life project. While it is easy to tick off the project's deliverables, it is much harder to quantify their contribution to the attainment of the vision or, indeed, when such a vision has been achieved. However in line with the defined activities for the task of dissemination, an attempt has been made to assess the effectiveness of each of the activities.

6.2.1.   Attend and present OpenMI-LIFE at relevant meetings

Due to the global spread of the OpenMI user community and the finite resources of time, manpower and money available, it has been particularly important to target meetings where there will be large gatherings of current or potential integrated modellers. It has also been important to maintain and develop the support of the partners own organisations by ensuring a steady flow of information back to them. Whilst we seem to be in the fortunate position of having many dissemination opportunities, finding the manpower to attend all the meetings has been difficult, since most team members are not full-time on the project; the Executive and Technical Committees have faced particularly heavy demands on their time. Despite this, creative use has been made of unplanned opportunities. For example, Roger Moore was funded by NERC to represent NERC at the opening of the Research Councils UK office in Washington, USA, and was able to use the trip to visit several key US organisations and scientists. The outcome was NSF funding for seven US scientists to visit the UK for an EU-NSF workshop from 7th-10th April 2008, in Wallingford, UK. As a result of the workshop, it is now possible that the Consortium of (120) Universities for the Advancement of Hydrologic Science will adopt the OpenMI, and that modules on the OpenMI will be taught in US university MSc courses. Other opportunities are being similarly exploited by the project members.

Some further examples of more conventional dissemination activities include the staging of two sessions on the OpenMI at the Harmoni-CA Final Conference, Belgium in September 2007. Peter Gijsbers will be presenting a paper at the 'Modflow and More' 2008 Conference, Golden, Colorado, USA, in May 2008 and running a post conference training course on the OpenMI. A session and workshop will be also be held at the iEMSs conference in Barcelona, Spain in July 2008, with similar sessions being planned for FloodRisk2008, to be held in Oxford, UK in September 2008. Roger Moore will be a keynote speaker at the SEAMLESS conference in 2009, following SEAMLESS's extensive use of the OpenMI. Numerous presentations have been made to smaller gatherings. For OpenMI-Life Workshops please see Section 6.2.3. Please also see Section 8.3 for information about further OpenMI collaboration opportunities.

6.2.2.   Prepare publicity materials

In December 2007, the first OpenMI Association newsletter was released by the Dissemination Committee. The newsletter was sent to a very wide audience including all known OpenMI contacts, and project members were encouraged to distribute the newsletter within their own organisations. It was decided to use a number of short case study outlines with links provided to websites providing the full articles. A section of the newsletter is given in Figure 4 below. The feedback received from the newsletter has been extremely positive, and a number of emails were sent to the Dissemination Committee as a result of the newsletter. It has been decided to make regular e-newsletters a priority in light of this positive response, and the next newsletter is currently being prepared.

Project Name: Bringing the OpenMI to Life
Grant Agreement: LIFE06 ENV/UK.000409
Version: Interim Report - 1st October 2006 – 31st March 2008

OpenMI supports integrated flood risk modeling in Havant, UK

In 2005, Atkins, a major international consultancy, was commissioned by the Environment Agency's Southern Region to undertake a flood risk mapping study of the Havant catchment. Atkins decided to look at the flooding as an integrated problem. The release of the OpenMI provided the opportunity to model the culverted reaches (represented in InfoWorks CS) linked to the river reaches (represented in InfoWorks RS). To have achieved the same level of integration without the OpenMI, would have involved a very long, complex iterative process in which level and flow results were passed between both models and the models run again and again until convergence was reached - a process that might not have yielded a satisfactory result. With OpenMI, the link simply passes results from one model to the other as they run.

⊞Read full story

⊞Read more about the OpenMI-Life project ⊞Download both workshops' presentations

Figure 4 Excerpt from the 1ˢᵗ OpenMI Association e-newsletter

In preparation for the summer conference season, a number of posters and leaflets are currently being prepared. Please see Appendix 4 for full details. The only task that is not currently in progress is the writing of press articles, which will be written towards the end of the project when there are more quantifiable results from the project to report on. A selection of materials prepared to date is given in Appendix 13.

6.2.3.   Organize workshops on the OpenMI

So far two of the five workshops planned for the OpenMI-Life project have been held. The first was held at the Aquafin offices in Aartselaar, Belgium in April 2007, and was an internal workshop for project members. The focus of this first workshop was on reviewing current project progress. It enabled project members to meet socially, to provide feedback for the Steering Committee as to how the project was progressing and whether sufficient technical and management support was being provided. The workshop met these aims, and the Steering Committee felt confident in opening up the next workshop to those outside the core project group. More information regarding both workshops can be found at www.openmi-life.org.

The second workshop was held in Wallingford, UK in November 2007 and was hosted jointly by CEH and Wallingford Software. This workshop was the first to be held under the auspices of the OpenMI Association and to be open to a wider audience than the project. The programme was ambitious. The first day focused on the progress of each of the seven OpenMI-Life Use Cases, and ended with a presentation of the OpenMI Association and its proposed strategy for supporting the OpenMI user community. The second day was completely devoted to presentations from those outside the core project team including a number of environmental and engineering consultants and the UK Environment Agency. Although most of these were from within the UK due to the location of the workshop, it was very encouraging to hear positive presentations on how

the OpenMI was being used in commercial operations to provide more cost effective and better answers. In the afternoon there was a presentation of the proposed OpenMI Association Strategy followed by a feedback discussion. The general feeling was that the proposed Strategy was in line with what the user community wanted, and that the Association was moving along the right lines.

The workshop was very well attended. Most participants were from the UK and Belgium and it was appreciated that we would need to make an effort to rotate future workshops around Europe, as most operational staff are unable to travel long distances. The feedback received was also very positive, and participants clearly both found the workshop helpful and enjoyed attending. Several workshop participants have expressed an interest in becoming more involved with the OpenMI, including joining the OpenMI Association, presenting papers at iEMSs on their work, and persuading their organisations to use the OpenMI.

Planning has now started for the third OpenMI workshop, which will be a Scheldt workshop to be held in Belgium. It has been agreed that the focus of this workshop should be technical, and that whilst we should aim to get scientists, and members of the Competent Authorities to attend, technical consultants and modellers, not managers should be invited. It is hoped though to encourage those within the wider Scheldt area to attend, and to tie this workshop in with the next phase of training for the Scheldt partners, so that this training can be opened up to a wider audience.

6.2.4.   Prepare a Layman's report

The Layman's report is not planned to be written until the second half of 2009, so that the experience gained from teaching and using the OpenMI interface in the seven different Use Cases of the project can be fully incorporated into the report. Its content though has already been discussed within the Documentation sub-group.

6.2.5.   Create and maintain the OpenMI-Life project web site

The OpenMI-Life project website, www.openmi-life.org, has primarily been designed to serve the needs of the OpenMI-Life project partners. It has been kept bilingual to improve communication with local end users and developers and promote the international character of the project. With the formation of the OpenMI Association, the focus has shifted to the OpenMI Association website, www.openmi.org. For more information about other OpenMI websites, please see Section 5.1.4.4.

6.3. REVIEW OF DISSEMINATION PLAN

The objectives and deliverables as described in the proposal for OpenMI-Life remain unchanged. However, the means by which they are being delivered is probably considerably ahead of anything anticipated when the proposal was written. It is an objective of the LIFE project to establish and leave in place an organisation to continue the development of the OpenMI, the OpenMI Association. This has become a functioning entity rather more quickly than expected. The major change from the proposal is, therefore, that, within the OpenMI-Life project, the Association is now responsible for the dissemination relating to the OpenMI. This is excellent because that element of the Association will be well tested by the end of the LIFE project.

Within the Association, the dissemination strategy is set by the Executive Committee, which then delegates responsibility for its execution to the Dissemination Committee (please see Appendix 8 for its Terms of Reference). Although not specifically a

Dissemination Plan, being aimed at the general promotion of the OpenMI rather than ensuring that all the project deliverables are achieved, the Terms of Reference do provide a very detailed view as to how the ongoing dissemination of the OpenMI will be maintained.

The OpenMI Association has just approved its new Strategy in which dissemination plays an important role. To achieve the adoption of integrated modelling and the OpenMI, both top down and bottom up approaches are being employed. The former involves convincing senior managers and policy makers of the benefits of integrated modelling and the use of the OpenMI, whilst the latter involves ensuring the OpenMI is taught in universities, so that there is a knowledgeable body of university graduates able to apply both.

Are the objectives set in the proposal being achieved? With respect to the physical deliverables listed in the proposal, some have already been delivered and plans are in place or are being drawn up for the delivery of the rest. However, much more importantly than that, we are beginning to see the take up of the OpenMI by European commercial organisations and its in depth evaluation by major US government agencies such as the EPA, US ACE, USGS and NSF. These seem to be good indicators that the dissemination programme is working.

SECTION 7.   EVALUATION AND CONCLUSIONS

7.1. PROJECT IMPLEMENTATION

7.1.1.   Project process

In many ways, the process for the OpenMI-Life project is straightforward and follows the usual guidelines for a demonstration project. In Task A, we have built-up the capacity of the end-user organizations in order that they can carry out and maintain the operational demonstrations. In Task B and Task C we have been applying the integrated modelling standards and technology in the Scheldt and Pinios Basins. Task E has concerned dissemination of the results of the project to Europe and the rest of the world, and project management has been covered by Task F.

Task D: "Demonstrate the OpenMI technical support, maintenance and coordination" is somewhat unusual, perhaps unique. Right from the beginning of the project, we have aimed to put in place a sustainable mechanism to ensure the long-term development and maintenance of the OpenMI standard and support services. The project team would not be satisfied with a once-only demonstration of the technical validity of the OpenMI, we are determined to create and demonstrate an organisation that we will not only run for the project, but which will ensure the widespread and long-term availability of the OpenMI.

Many demonstration projects have proved the usefulness of new technology, but they have failed to recognise the need for the continuous maintenance of that technology, and have not put a long-term support system in place. The creation, development and operation of the OpenMI Association is essential if this demonstration project is to have lasting success.

We are clear how we judge lasting success; we will only be satisfied when we have changed working practice in water management. We believe that integrated management will be essential to meet the ever more complex environmental and human needs, and we

are certain that integrated management cannot happen in a satisfactory way without cost-effective integrated modelling.

We are satisfied that the project progress so far shows that the OpenMI can provide the key to achieving integrated, operational water management, and that this should be sustained beyond the project. However, there is still much work to be done to ensure that this happens.

7.1.2.   Project management

The project has had very few project management issues, and these have been sorted out very well with little fuss. It has perhaps helped that the majority of the core project team has worked together in one way or another in the past, and that strong working relationships were already in place at the start. The project is not a thinly disguised set of separate projects, as is the trend with EU projects. Instead, we have tried to integrate all members of the project, so all are committed to a collective success.

The main danger at the beginning was that the new members of the team who had not worked together before would not integrate well. The management team has made every effort to give newcomers all the support they need so they can make a full contribution right from the beginning. This has generally been successful.

The most difficulties occurred within Liege University and within VMM, when both these organizations lost key staff and under went profound reorganisations. However, VMM has found a replacement who is working well, and Liege University has recruited a new member of staff who is due to begin shortly.

7.1.3. Technical and commercial application

Three members of the project: Wallingford Software, DHI and Delft Hydraulics, create and distribute software tools and products commercially, and all three have already incorporated the OpenMI into their software systems, and so have made the OpenMI available outside the OpenMI-Life Project.

The OpenMI has also been incorporated in other water models and systems. Please see Appendix 2 for a list of OpenMI Compliant Models. Some of these systems are being used in other EU research projects, so the OpenMI is beginning to be taken up for commercial applications and for research activities.

The water modelling community, both government-led and within academia, is becoming more involved with the OpenMI. There have been several evaluations and prototyping activities. Furthermore, the OpenMI Association has become a focus for the planning of collaborative research between Europe and the USA.

Hence, even at this early stage, the OpenMI has proved to be commercially viable and successful. The limitation that the project has encountered is the slow uptake of integrated modelling itself. This is typified by application of the Water Framework Directive in Europe. Originally, it was anticipated that integrated modelling would be central to catchment management plans; however, this has not been the case for the first round of plans. We do anticipate that practical experience in the Scheldt and Pinios Basins will point the way towards true integrated management for the second round of plans.

7.1.4. Comparison against the project objectives

7.1.4.1. Task A – Build Capacity

7.1.4.1.1 Design and plan training

Completed as planned.

7.1.4.1.2 Provide End User training in setting up the OpenMI, OpenMI concepts and Use Cases

Completed first round of training as planned.

7.1.4.1.3 Attend End User training in setting up the OpenMI, OpenMI concepts and Use Cases

Completed first round of training as planned.

7.1.4.1.4 Provide training to Developers in OpenMI upgrades

Completed first round of training as planned.

7.1.4.1.5 Attend training for Developers in OpenMI upgrades

Completed first round of training as planned.

7.1.4.2. Task B - Demonstrate the OpenMI in the Scheldt Basin

7.1.4.2.1 Prepare Use Case definitions

All four use case definitions completed and reviewed as planned. Use Case C definition has undergone a minor revision which is now complete.

7.1.4.2.2 Migrate models to the OpenMI Interface

The first pass migration of all models is complete and tested as planned for all except the Pegase model. More work than anticipated has been necessary for the Pegase model, as it had first to be converted to run under the Windows operating system. A new plan for its migration is now in place, which should mean that we can achieve the aims of Use Case C within project deadlines. All other models are now compliant with the latest OpenMI release – Version 1.4.

7.1.4.2.3 Demonstrate under operational conditions

The initial round of integration was completed successfully as planned for Use Case A, B and D. Use Case C has now been rescheduled, and we still expect it to succeed. Full operational demonstration for all four use cases is planned during the next year of the project.

7.1.4.2.4 Evaluate operational use

The initial feedback on integration activities has been given. This task will largely be carried out towards the end of the project.

7.1.4.3. Task C - Demonstrate the OpenMI in the Pinios

7.1.4.3.1 Prepare Use Case definitions

All four use case definitions completed and reviewed as planned.

7.1.4.3.2 Migrate models to the OpenMI Interface

The first pass migration of all models bar one is now complete and tested as planned. No problems are anticipated with the migration of the final model for Use Case A. All models are now compliant with the latest OpenMI release – Version 1.4.

7.1.4.3.3 Demonstrate under operational conditions

The initial round of integration has been completed successfully as planned, bar the one model for Use Case A which should soon be compliant. Full operational demonstration for all three use cases is planned during the next year of the project.

7.1.4.3.4 Evaluate operational use

Initial feedback on integration activities has been given by competent authorities in the Pinios region. This task will largely be carried out towards the end of the project.

7.1.4.4.   Task D - Demonstrate the OpenMI technical support, maintenance and co-ordination

7.1.4.4.1 Prepare working procedures and co-ordination protocols

This task has been completed. The major work has been writing the Constitution, Rules and Standing Orders for the OpenMI Association. This had more legal complications than anticipated and took longer to complete, but it is done finished.

7.1.4.4.2 Set up and manage a sustainable coordination organisation

The OpenMI Association is now a legal entity under Dutch Law and is open for new members to join. The Executive Committee, the Technical Committee and the Dissemination Committee have all been formed and are operational. The first General Meeting was held in October 2007, and the first Annual General Meeting was held on 13 March 2008. The Executive Committee has produced a Strategy for the Association. Everything is proceeding as planned.

7.1.4.4.3 Periodically release OpenMI upgrades and evaluate protocols

Version 1.4 of the OpenMI Standard was released on 21 December 2007 after much work. This was somewhat later than anticipated because the Technical Committee decided to be more ambitious with the content so that Version 1.4 gave more benefits to users. It also meant that the standard is now relevant to both .NET and Java, a benefit that had not been planned for this early date. Version 2.0 will be released later than originally anticipated, because Version 1.4 meets the user's needs to a greater extent than had originally been anticipated at the start of the project.

7.1.4.4.4 Maintain the OpenMI web sites

The project has made good use of the Sourceforge open software web site. The Technical Committee has used this site for release of the OpenMI Standard and software development kit. The Technical Committee also launched the OpenMI Wiki, a forum for support and planning. This has stimulated a high standard of technical discussion and has encouraged wider participation in OpenMI. The OpenMI-Life Project website was created on time with the planned content. The OpenMI Association website was created later than planned and is still limited in content, but good progress is now being made and we anticipate this website will meet its design criteria within the next year.

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7.1.4.5.   Task E – Dissemination

The spread of information about OpenMI itself has been hugely successful. With the support of members of the OpenMI-Life project, this technology has become well-known to the water modelling community right around the world, with good uptake in Europe and the USA, but also with users in countries such as Japan and Australia. Both academic and commercial organisations have become actively involved with the OpenMI.

Dissemination of the OpenMI and integrated modelling amongst water management organisations has been more difficult, but this was to be expected as these organisations tend to be conservative in outlook and somewhat resistant to uptake of new technology. However, in key parts of the world we have been able to establish the OpenMI as a key standard for integrated water modelling, with encouraging references within Rijkwaterstat (Netherlands), UK Environment Agency, EPA (USA) and USACE ERDC & HEC (USA).

7.1.4.6.   Task F - Manage OpenMI-LIFE

The Collaboration Agreement was prepared, agreed and signed in good time. The Steering Committee was formed and is working effectively. Committee meetings have been well prepared with Agendas set and distributed. Some progress reports have been distributed a little too late before the meetings, but this has improved as the project has progressed. All the Tasks have been well managed. Reports to the EU have been complete, delivered on-time and have hopefully been informative. Certainly the EU assessment team has been satisfied so far. The Project Coordinator has represented the project at EC Co-ordination meetings such as those called by DG RTD and the Harmoni-CA meeting.

Some difficulties were apparent during the change-over period between project managers, but other members of the project team were supportive during this time and the progress of the project did not suffer. In addition, it should be said that the OpenMI-Life Team members are particularly pleased with the management team and the exceptionally high quality of their leadership (comment inserted by a team member).

Section 7.1.3 shows that the OpenMI has become established well before the end of the OpenMI-Life project, and the OpenMI Association is now in operation, as planned. However, the aim of the OpenMI Association is to establish integrated modelling itself as a high-performing technology to support water management, through use of OpenMI, this has not yet been achieved. While integrated modelling is accepted as being of value, it has not yet had substantial impact on water management in practice. This expected to take several years to occur.

The aim of the OpenMI-Life Project is to show that the OpenMI can be used to change and improve operational water management. The OpenMI Association is needed in order to provide users with a trusted framework so they can be confident enough to invest time and money in use of OpenMI. So far, this has been successful. However, the other proof that is needed is good outcomes from the Scheldt and Pinios demonstrations, and whilst we are making good progress, it is too early to say whether these will ultimately be successful.

7.1.5.   Effectiveness of dissemination activities

The project has held three major meetings or workshops so far. The first meeting was only for project members and intended to promote understanding and collaboration between partners. It was a very lively meeting and succeeded in involving all partners in

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the project. The first workshop was used to disseminate information about the initial findings from each task to all the project members. This went well and we all came away with a complete picture of progress so far.

The second workshop was held in the UK and was open to external participants. We had a high number of participants from a broad range of stakeholders in integrated modelling, from competent authorities to engineering consultants to model developers, but they were mainly from the UK. We conclude that while we are able to attract good participants, they will probably not be willing to travel far. In future we will try to distribute our workshops around Europe to better promote better dissemination.

Project members have made presentations and taken part in a number of conferences and workshops where we have had the opportunity to promote knowledge of the OpenMI-Life project. We have backed this up with the OpenMI-Life and OpenMI Association websites which are attracting interest from around the world.

We have been able to build up a good contact database of people with an interest in the OpenMI. Everyone on the list received a copy of the first OpenMI Association email newsletter. The newsletter made reference to both our websites. One indication of success is that a relatively high number of readers have followed-up the links in case studies on the website.

In conclusion, although the project is still at an early stage, it is clear that the OpenMI community is growing worldwide, and the OpenMI-Life project has an extremely high profile considering it is still at an early stage.

7.1.6.   Project future

The OpenMI support structure is up and running and there should be no problems in maintaining it throughout the project. The Pinios use case studies and all but one of the Scheldt use case studies are well under way and will meet their targets and conclude successfully so long as progress is maintained, which we anticipate. The Scheldt Use Case C has had some significant problems, but is undergoing a complete re-plan. As long as the new plan is achievable, then we should be able to conclude this Use Case before the end of the project.

In conclusion, there are no present reasons to doubt the success of the project and the establishment of the OpenMI Association should ensure its long term continuation.

7.2. ANALYSIS OF LONG-TERM BENEFITS

7.2.1.   Environmental benefits

The project provides no direct environmental benefits. However, so long as the project continues as it promises, it should be a major contributor to the acceptance and uptake of integrated environmental management, not just in Europe, but worldwide. This is an important policy objective of DG Environment.

We expect to see a direct impact from this project upon the basin plans produced under the second round of the EU Water Framework Directive. The application of integrated

modelling using the OpenMI has already been of benefit to engineering consultants involved in urban flood studies. Its visible commercial success will be important to its wider take up.

7.2.2. Long-term sustainability

OpenMI-Life is all about making integrated water management a reality, not just a distant intention, and integrated water management will bring tremendous environmental benefits. However, we all must be aware that taking a truly integrated approach is not easy. It is much more comfortable for competent authorities to stick with the old ways of doing things, and separate basin management into a set of discrete problems, isolated by national boundaries, with different organisations considering just one part of the problem with no reference to the whole.

OpenMI-Life is already indicating that we can surmount the technical issues of integrated modelling, and we are showing that integrated water management is technically possible. Perhaps more importantly though, we are learning to overcome the institutional issues that could prevent integrated water management from becoming an everyday operational reality.

We will keep monitoring and follow up this area of progress in later reports.

7.2.3. Replicability, demonstration, transferability and cooperation

The OpenMI Standard and the OpenMI Association are the main means by which the OpenMI-Life Project will be transferable and will encourage commercialization. By any measure, the Project has already been successful in this respect.

There should be caution however. The OpenMI standard for integrated modelling has huge environmental benefits by the way in which it should allow integrated water management to become an economic and social reality. However, it is unlikely that the OpenMI itself will ever have an economic value. Nobody will buy the OpenMI for a large sum of money. This is the way it is for such standards. Success depends on the growth of an industry based around integrated modelling and integrated water management. Until this is well established, the OpenMI and the OpenMI Association will need further financial assistance, preferably from an international, non-proprietary source such as the EC. Once the technical capabilities of the OpenMI are accepted, it is these issues together with 'openness' that will determine the adoption of the OpenMI by the major players.

7.2.4. Innovation

The OpenMI Standard and its associated software toolkit are highly innovative. Many people consider single-issue water modelling to be innovative and difficult, yet the OpenMI brings integrated water modelling out of the research and puts it in the operational world of the water manager. Of course the integration of individual process models will raise many issues but now we are in a far better position to address these issues. By making the OpenMI open, this new capability is available to all, creating a huge range of opportunities for researchers, government agencies and industry. Making it open has probably ensured that it has received the most rigorous peer review achievable.

The OpenMI is already creating new ways of delivering University research to industry. An independent European initiative is creating the OpenWeb, a place where researchers

can find and use a range of linkable models for teaching and research. However, OpenWeb has a second purpose, which is to showcase university research to industry. A similar initiative is taking place in the US.

The Commission is keen to encourage intercontinental collaboration. The OpenMI has provided the tools that will allow the big issues requiring global collaboration to be worked upon, for example, the impact of climate change upon flood damage costs.

SECTION 8.   AFTER-LIFE COMMUNICATION PLAN

8.1. OPENMI ASSOCIATION STRATEGY

To ensure that there is long-term support for the OpenMI after the LIFE project has been completed, the LIFE project has established the OpenMI Association to take ownership of the OpenMI. The Association's charter and strategy documents will form the basis of the 'After-LIFE Communication Plan'.

The objective of the Association is: 'The promotion of the development, use, management and maintenance of the Open Modelling Interface (the OpenMI), a standard for the exchange of data between computer software in environmental management.' An important element of the Association's initial work will be planning the continuation of the these activities after the LIFE project.

The vision of the OpenMI Association for the mid and long term future is one where the concept of integrated modelling is widely accepted by authorities as leading to better decisions, and where it is standard practice in environmental management. Preconditions for such wide acceptance and adoption are seen as being that there is general confidence that integrated modelling has benefits, and that there is a credible strategy in place for the support of integrated modellers and the OpenMI.

To achieve this vision, the Association has therefore developed the following strategy (the key points only are listed here – the full strategy is given in Appendix 11):

Create a culture in which integrated modelling is accepted. This requires a top down approach in that we need to ensure that the key decision makers (the competent authorities) are aware of the added value of integrated modelling and of the role of the OpenMI. Currently, it is believed that the most effective way to accomplish this will be by involving them in joint demonstration projects. Changing the culture also requires a bottom up approach to ensure that the OpenMI becomes a standard topic in university courses. This will be achieved by encouraging universities to include integrated modelling and OpenMI modules in their MSc and PhD projects.

Support the OpenMI user community through help forums, training, etc.

Disseminate information

Make the technology available The OpenMI Association will ensure that the OpenMI is entirely open and has no use constraints other than those necessary to protect the use of the name OpenMI. The Association will also ensure that there is always at least one Software Develop Kit (SDK) and Graphical User Interface (GUI) available under suitable open source licence conditions.

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Establish a compliancy service By developing a procedure for establishing that models comply with a particular release and encouraging third parties to provide an auditing service.

These then are the key elements of the 'After-LIFE Communication Plan'. Primary responsibility for their implementation lies with the OpenMI Association Executive Committee. However, it relies heavily on the Technical and Dissemination Committees together with external sources for support and advice. Their contribtions have been described above.

8.2. FURTHER COLLABORATION PROJECTS

An important element of the strategy is to gain the acceptance of policy makers and modellers that integrated modelling leads to better decisions. While that acceptance is being achieved, a second element needs to be put in place. This is the creation of a body of engineers, scientists and IT people who have the understanding and skills to implement integrated modelling.

It is felt that the best way to achieve the first, is to involve the key players in a succession of demonstration projects covering the different domains and areas of the world. The OpenMI-Life project has set up seven such demonstrations. However many more will be required to achieve global buy-in even within the limited target area of land and water management. The partners are therefore identifying the key players – major government agencies, model developers, consultants and researchers, establishing contact and proposing joint projects. The initial focus is on Europe and the US. In the latter, contact has been established with the National Science Foundation (NSF), the Environmental Protection Agency (EPA), the United States Geological Survey (USGS) and United States Army Corps of Engineers with whom detailed discussions and trials are underway with a view to setting up joint projects.

Similar discussions are taking place in Europe, though the emphasis here has been on persuading industry to start using the OpenMI, Already a number of small commercial applications have been successfully completed. The OpenMI-Life commercial partners are also introducing the OpenMI into their own products and services.

To create a new body of integrated modellers, the second element of the strategy, the Executive Committee is taking every opportunity to encourage universities to introduce courses or course modules on integrated modelling and the OpenMI. It is also encouraging MSc and PhD projects based on integrated modelling and the OpenMI. This policy is already bearing fruit on both sides of the Atlantic. It will be be pursued vigorously in the second half of the LIFE project, as this is probably one of the most effective ways of ensuring that the OpenMI has a life after LIFE. In addition to Universities, the Executive Committee is in touch with major Government research labs to create joint projects with them. Partnership with these organisations should enable more complex problems to be tackled such as the linking of conventional models to those running in the super-computing environments. Other projects could consider the scientific problems that arise when models from different domains based on different modelling concepts are linked. For example CEH (NERC) is drafting a proposal for a three year project to explore a science question such as, 'what could be the impacts of drought on ecosystem services in wetlands?'. The project will require the linking of climate, hydrological, land surface and ecological models in ways not previously considered.

The partners will use the second half of the project to seek funding for the After-Life phase of the OpenMI.

SECTION 9. PLANNED PROJECT PROGRESS

For Task A, Build Capacity, a further set of training courses is being planned. To enable more people to be reached and to cover more details of the recent release v1.4 and the planned release v2.0, these are now scheduled to be held late in 2008.

For both Tasks B and C, the Demonstration of the OpenMI in the Scheldt and the Pinios, the integrated modelling trial activities are still being completed. Once all model migrations have been fully tested, the Use Cases will move into the six month 'demonstration under operational conditions' phase, aiming to complete this in the period October 2008 to March 2009. This phase will be followed by a final evaluation phase lasting until the end of the project.

For Task D, Technical Support, Maintenance and Coordination, there are a number of ongoing activities. Whilst the support organisation, the OpenMI Association, has been set up, its structure and working procedures are still evolving.. The Technical Committee of the OpenMI Association has taken over responsibility for providing further upgrades and releases of the OpenMI. Its work for the last part of the project will be focussed first on the beta release of version 2.0, which is planned for June 2008, and then the final release, planned for early 2009. Responsibility for the maintenance of the Association websites has been transferred to the OpenMI Association Dissemination Committee. This will continue to be a major task for the rest of the project. The Dissemination Committee will also continue to be responsible for newsletters, articles, and so on, until the end of the project.

Task E, Disseminate Information, has a number of extra ongoing tasks, these include attending and presenting OpenMI-Life at meetings, preparing publicity materials and creating an OpenMI-Life website. A number of workshops are already planned for the remainder of 2008, including a combined EU-NSF workshop in April, an EU-EPA workshop in May, an EU-USACE workshop later in the year, a CEH workshop for UK NERC researchers in June and a LIFE project Scheldt workshop in November to be hosted in Belgium. An OpenMI presence is also being planned at a number of key conferences including iEMSs and FloodRisk2008, over the next year. OpenMI users from outside the LIFE project are now being encouraged to present papers and participate in conferences. The Layman's Report will be written in 2009.

All Task F, Manage OpenMI-Life, activities are ongoing for the remainder of the project. Steering Committee meetings are being planned on a quarterly basis. Two further six monthly EC progress reports will be written, and a Final Report submitted to the EC at the end of the project.

Since the formation of the OpenMI Association, an additional management structure has been created which will continue to exist once the LIFE project has been completed. Whilst the OpenMI-Life Steering Committee still has overall responsibility for the LIFE project, responsibility for the future maintenance and promotion of the OpenMI has transferred to the OpenMI Association's Executive Committee.

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As can be seen from the Gant chart below, overall the project is on schedule, although there have been minor modifications to task delivery timings compared to the original proposal.
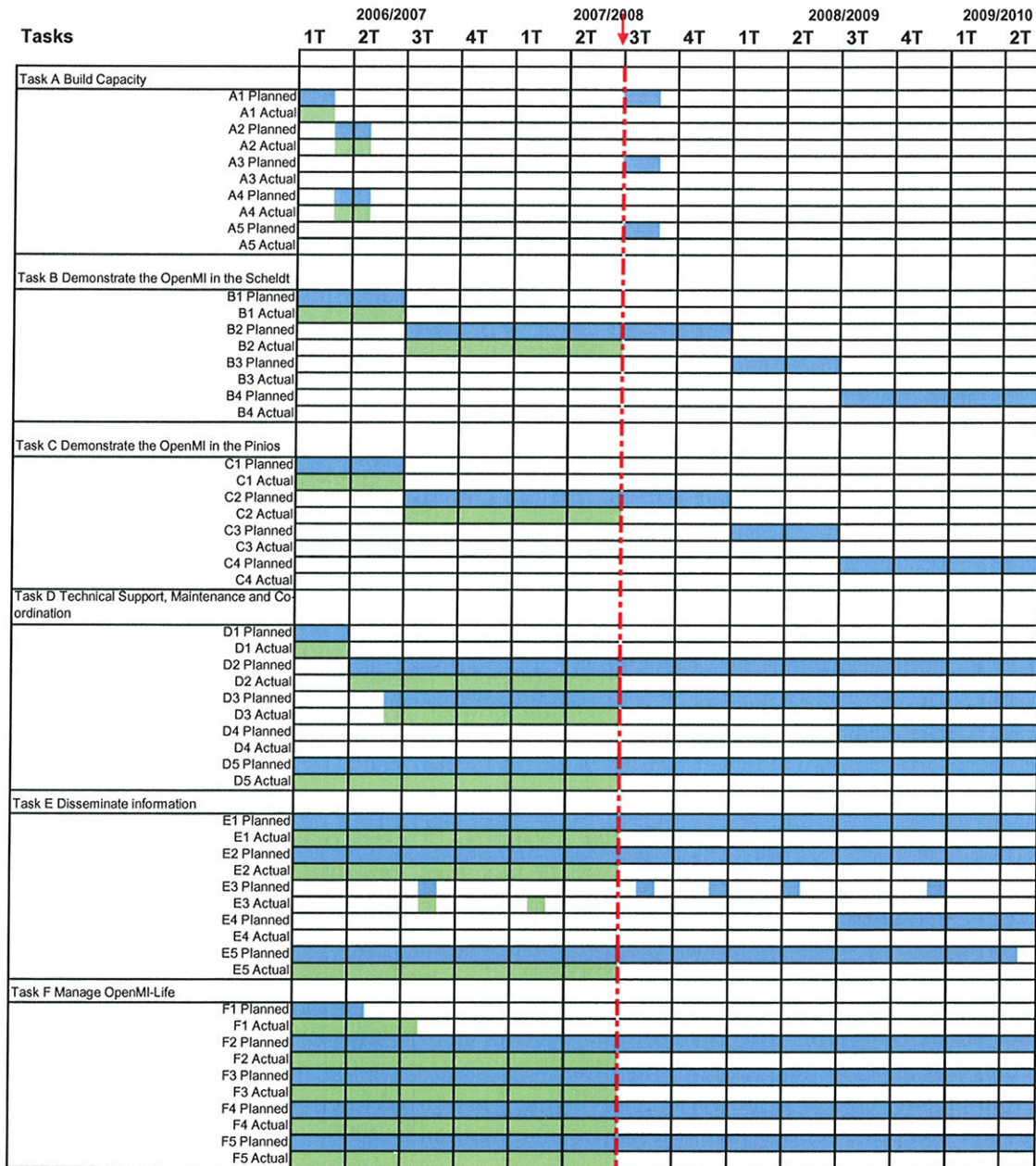

Figure 5 Overview of the OpenMI-Life Work plan

SECTION 10.   COMMENTS ON FINANCIAL REPORT

Table 1 shows the project costs for all partners incurred since the start of the project up until 31/03/2008.

Table 1 Project costs incurred

Cost category	Total cost according to the Commision's decision*	Costs incurred from the start date to 31/03/2007	%**
1 Personnel	2660632	1,018,882	38.3
2 Travel	544450	90,809	16.7
3 Outside assistance	422080	43,164	10.2
4 Durables: total non-depreciated cost			
- *Infrastructure sub-tot.*	-	-	
- *Equipment sub-tot.*	50800	11,924	23.5
- *Prototypes sub-tot.*	-	-	
5. Consumables	10000	8	0.1
6. Other costs	54500	6,925	12.7
7. Overheads	**260194**	82,854	31.8
SUM TOTAL	**4002656**	1,254,565	31.3

Although it would appear that the project is under spent, there are a number of clear reasons for this. Firstly, for many partners there are delays in invoice processing, particularly with regards to External Assistance and Travel expenses. This has been a particular problem for VMM-AWA who are significantly behind in being invoiced for Neel Devroede's time. Secondly, there are some items of expenditure that will occur towards the end of the project, for example, technical writing which will cost €32,000. Similarly, conference attendance and workshop organization are likely to be concentrated to the latter half of the project, when there are more results to present. We are also hosting collaboration workshops with external bodies such as the US NSF with more planned, for which this additional budget will be very useful. Thirdly, in view of the current Euro, GB pound exchange rate, which was 1.27 as of 01/04/2008 as opposed to 1.48 on 01/10/2006, any UK expenditure has significantly less remuneration under the LIFE Common Provisions now than at the time the proposal was written. Should the exchange rate recover, this would equalize expenditure out again. Lastly, due to internal reorganization within ULG, there have been delays in Use Case B2; this time will soon be caught up with additional time needing to be put in by ULG, VMM, and FH to get the Use Case back on track.

With regards to project income, please note that due to the large number of partners on the project, there is a difference of €451.27 between the initial payment to the project

beneficiary and the amounts received by each project partner. Since there are twelve project partners, a higher proportion of this payment has been lost to bank charges and exchange rate differences, than would normally be expected.

In conclusion, whilst the project is currently slightly under spent, this is partly due to delays in invoicing. Also given that we are currently receiving considerable external interest in the OpenMI with requests for conference attendance and meetings/workshops with a view to further collaboration, much of this under spend will soon be accounted for.

SECTION 11.   APPENDICES

Appendices are provided below giving information on the following topics:

Task Deliverables and their Status
OpenMI Compliant Models
Participant Information
Meetings
Publications
Definition of OpenMI Compliance
New planning and timing for the Scheldt use case c
OpenMI Association Dissemination Committee Terms of Reference
The OpenMI Association Charter
The OpenMI Association Strategy
The Collaboration Agreement
Examples of dissemination material developed

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APPENDIX 1 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	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	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	December 2009	Not started
Task E/2	Papers and Journals (6), e.g. Journal of HydroInformatics.	2 completed, June 2008 (3), June 2009(1)	Started
Task E/3	Press articles (8)	2008 (2), 2009 (6)	Not Started
Task E/4	Conference presentations (6), e.g. HydroInformatics and iEMSs	3 completed. May 2008(1), June 2008 (2),	Ongoing
Task E/5	OpenMI-Life web site (multi-lingual)	Operational / continuous updates	Ongoing
Task E/6	Workshops(5)	2 completed. November 2008 (1), May 2009 (1), November 2009(1)	Ongoing
Task E/7	Associate with existing newsletters (3),e.g. Rivers List, IAHS, etc.	1 completed HarmoniCA). 2008 (1), 2009 (1)	Started
Task E/8	Leaflets (4, multi-lingual)	May 2008 (2), December 2009 (2)	Started
Task E/9	Posters (4)	1 completed. May 2008 (2) , May 2009 (1)	Started
Task E/10	Layman's report	December 2009	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	Completed

Deliverable No	Deliverable title	Delivery date	Status
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

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APPENDIX 2 OPENMI COMPLIANT MODELS

Below is a table detailing all reported OpenMI compliant models.

Company	Compliant Models & Components	.NET	JAVA	General description/ Compliance
Alterra	Capri		x	Agricultural policy impact model
	FSSIM		x	Bio-economic model
	Apes		x	Biophysical model
	MetaSwap en Simgro		x	Hydrological model
BAW	GEI Wrapper	x		Access to propriatary data for Delft 3D flow
CEH	Classic	x		Hydrological model
CRWR	ArcHydro	x		Hydrological model
Delft Hydraulics Software	Sobek 1DFlow	x		Urban/ Rural/River model
	Delft3D	x		2D/3D flow model
	DelftFEWS	x		Flood forecasting model
DHI software	MIKE 11	x		Hydraulic model
	MIKE SHE	x		Hydrological model
	MIKE URBAN	x		Urban drainage model
Hydrologic Engineering Center	HEC-RAS	x		Hydraulic model
NTUA	RMM - NTUA	x		Reservoir watershed management model
	RiSH-1D	x		Hydraulic model
Utrecht University	PCRaster	x		Data interface component
RIZA	DM	x		Surface water transport model component
	Mozart	x		Unsaturated zone model component
	Agricom	x		Agricultural model
	NwSim	x		
	DemNat	x		Ecohydrological model
	DistrConnector	x		
Wallingford Software	Info Works RS	x		Hydraulic model
	Isis	x		Hydrological model
	Info Works CS	x		Sewer model
	SULIS	x		3D lake and estuary model
Schlumberger Water Services	Visual Modflow	x		Groundwater model
University of Thessaly	UTHBAL	x		Hydrological model
WRc Plc	STOAT	x		Wastewater treatment model

APPENDIX 3 PARTNER INFORMATION

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

			TASKS A-F	CONTRACT	STEERING COMMITTEE	TECHNICAL COMMITTEE
OpenMI-Life Cordinator CEH Wallingford, UK	Mr. Roger V. Moore CEH Wallingford Wallingford Oxon OX10 8BB. UK	Tel: +44 (0)1491 692235 Mobile: +44 7834 184334 Fax: +44 (0)1491 692424 Email: rvm@ceh.ac.uk	A, B, C, D, E, F	✓	✓	
Project Manager CEH Wallingford, UK	Miss Hazel Murphy CEH Wallingford Wallingford OX10 8BB. UK	Tel: +44 (0)1491 692205 Fax: +44 (0)1491 692424 Email: harp@ceh.ac.uk	A, B, C, D, E, F	✓	✓	
On maternity leave (Role being covered by Hazel Murphy)	Ms. Isabella Tindall CEH Wallingford Wallingford OX10 8BB. UK	Tel: +44 (0)1491 692205 Fax: +44 (0)1491 692424 Email: ciit@ceh.ac.uk	A, B, C, D, E, F	✓	✓	
DHI Water and Environment, Denmark	Dr. Jan Gregersen DHI Water and Environment Agern Allé 11 DK-2950 Hørsholm Denmark	Tel: 45 45 16 9221 Fax: +45 4516 9292 Email: JBG@dhigroup.com	A, B, C, D, E, F	✓	✓	✓
DHI Water and Environment, Denmark	Mr Peter Sinding DHI Water and Environment Agern Allé 11 DK-2950 Hørsholm Denmark	Tel: +45 4516 9047 Mobile: +45 2398 4748 Email: psi@dhigroup.com	A, B, C, D			✓
Wallingford Software Limited, HR Wallingford Group, UK	Ms Susan Anderson Wallingford Software Ltd. Howbery Park Wallingford OX10 8BA. UK	Tel: +44 (0)1491 822322 Fax: +44 (0)1491 826392 Email: susan.anderson@wallingfordsoftware.com	A,			

Organisation	Contact	Contact details	TASKS A-F	CONTRACT	STEERING COMMITTEE	TECHNICAL COMMITTEE
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. Adrian Harper Wallingford Software Ltd. Howbery Park Wallingford OX10 8BA. UK	Tel: +44 (0)1491 824777 Fax: +44 (0)1491 822221 Email: adrian.harper@wallingfordsoftware.com	A,			
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*	Prof. Maria Mimikou NTUA Iroon Polytechniou 5 157 80 Athens, Greece	Tel: +30 210 772 2880 Fax: +30 210 772 2879 Email: mmimik@chi.civil.ntua.gr	A, C, D, E		✓	
NTUA National Technical University of Athens, Greece *Pinios partner*	Dr. Ria Safiolea (Contact person) NTUA Iroon Polytechniou 5 157 80 Athens, Greece	Tel: +30 210 772 2885 Fax: +30 210 772 2879 Email: safiolea@chi.civil.ntua.gr	A, C, D, E	Send to Maria Kalliampakou (financial & admin) mkalli@chi.civil.ntua.gr	✓	
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*	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			

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		TASKS A-F	CONTRACT	STEERING COMMITTEE	TECHNICAL COMMITTEE
UTH University of Thessaly, Greece *Pinios partner*	Prof. Antonis Liakopoulos, University of Thessaly, Pedion Areos, 383 34 Volos, Greece	C	✓	✓	
UTH University of Thessaly, Greece *Pinios partner*	Prof. Athanasios Loukas, Department of Civil Engineering, University of Thessaly, 38334 Volos, Greece	C			
UTH University of Thessaly, Greece *Pinios partner*	Mr.Pandelis Sidiropoulos, Department of Civil Engineering, University of Thessaly, 38334 Volos, Greece	C			
UTH University of Thessaly, Greece *Pinios partner*	Prof. Nikitas Mylopoulos, Department of Civil Engineering, University of Thessaly, 38334 Volos, Greece	C			
Aquafin Belgium	Mr. Johan Van Assel, Aquafin, Dijkstraat 8, 2630 Aartselaar, Belgium	A, B, C, D, E, F	✓	✓	
Aquafin Belgium	Mr. Chris Thoeye, Aquafin, Dijkstraat 8, 2630 Aartselaar, Belgium	A, B, C, D, E, F			
Aquafin Belgium	Gunther Waterschoot, Aquafin, Dijkstraat 8, 2630 Aartselaar, Belgium	B			

Contact details:
- Prof. Antonis Liakopoulos: Tel. +30 2421 074111, Fax +30 2421 074169, Email: aliakop@uth.gr
- Prof. Athanasios Loukas: Tel. +30 24210 74168, Fax +30 24210 74169, Email: aloukas@civ.uth.gr
- Mr.Pandelis Sidiropoulos: Tel. +30 24210 74153, Fax +30 24210 74169, Email:psidirop@uth.gr
- Prof. Nikitas Mylopoulos: Tel. +30 24210 74162, Fax +30 24210 74169, Email: nikitas@civ.uth.gr
- Mr. Johan Van Assel: Tel. +32 3 450 4082, Fax +32 3 450 4444, Email: johan.vanassel @aquafin.be
- Mr. Chris Thoeye: Tel. +32 3 450 40 72, Fax +32 3 450 4444, Email: chris.thoeye@aquafin.be
- Gunther Waterschoot: Tel. +32/3 4504088, Fax +32/3 4504185, Email : gunther.waterschoot@aquafin.be

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Partner	Contact	Contact details	TASKS A-F	CONTRACT	STEERING COMMITTEE	TECHNICAL COMMITTEE
VMM-AK 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-AK 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-AK 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 Research Belgium *Scheldt partner*	Mr. Hans Vereecken Vlaamse Overheid - Departement Mobiliteit en Openbare Werken Afdeling Waterbouwkundig Laboratorium Berchemlei 115 | B-2140 Borgerhout	Tel : + 32 3 224 61 89 Fax : + 32 3 224 60 36 Email: hans.vereecken@mow.vlaanderen.be	A3, B2, B3, B4, E	✓	✓	

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		TASKS A-F	CONTRACT	STEERING COMMITTEE	TECHNICAL COMMITTEE
FH Flanders Hydraulic Research Belgium	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			
Scheldt partner					
FH Flanders Hydraulic Research Belgium	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			
Scheldt partner					
VMM-AWA Vlaamse Milieumaatschappij Afdeling Water Belgium	Dhr. Kris Cauwenberghs Vlaamse Milieumaatschappij Afdeling Water Graaf de Ferraris-gebouw Koning Albert-Il laan 20 1000 Brussel Tel: +02 553 21 29 Fax: +02 553 21 05 Email: kris.cauwenberghs@lin.vlaanderen.be	A, B, E	✓	✓	
Scheldt partner					
VMM-AWA 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	Ir. Jean-Francois Deliege CEME - Universite de Liege Centre d'Etude et de Modelisation en Environnement B5 Sart-Tilman 4000 Liege – 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	✓	✓	
Scheldt partner					

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Organisation	Contact	Contact details	TASKS A-F	CONTRACT	STEERING COMMITTEE	TECHNICAL COMMITTEE
ULG University of Liege Belgium *Scheldt partner*	Ir. Joseph Smitz CEME - Universite de Liege Centre d'Etude et de Modelisation en Environnement Sart-Tilman B5 4000 Liege - 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			
Deltares, The Netherlands	Dr. Peter Gijsbers Deltares P.O. Box 177 2600 MH Delft The Netherlands	Tel: +31 15 285 89 28 Fax: +31 15 285 85 82 Email: peter.gijsbers@deltares.nl	D			✓
Deltares, The Netherlands	Mr. Jaco Stout Deltares P.O. Box 177 2600 MH Delft The Netherlands	Tel: +31 15 285 87 63 Fax: +31 15 285 87 11 Email: jaco.stout@deltares.nl	A, B, D, F	✓	✓	
Deltares, The Netherlands	Mr Stef Hummel Deltares P.O. Box 177 2600 MH Delft The Netherlands	Tel: +31 15 285 85 09 Fax: +31 15 285 85 82 Email: stef.hummel@deltares.nl	D			✓

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			TASKS A-F	CONTRACT	STEERING COMMITTEE	TECHNICAL COMMITTEE
Deltares The Netherlands Scheldt partner	Mr. Edwin Spee Deltares P.O. Box 177 2600 MH Delft The Netherlands	Tel: +31 15 285 88 29 Fax: +31 15 285 87 11 Email: Edwin.Spee@deltares.nl	A3, A5, B4, E			
Deltares The Netherlands Scheldt partner	Mr. David Kerkhoven Deltares P.O. Box 177 2600 MH Delft The Netherlands	Tel: + 31 15 285 87 45 Fax: + 31 15 285 87 85 Email: david.kerkhoven@deltares.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			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 is the InformationDesk for Standards in the Water domain, the Netherlands)	IDsW-informative meeting on external developments.		Oral presentation.

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Authors	Date	Title	Event	Reference	Type
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. April 2007 – September 2007.			Customer Report to the European Commission. October 2007.
Devroede, N., Vits, S.		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
Moore, R. V., Murphy, H. M.	3-4 December 2007	OpenMI Association poster	CEH Annual Staff Conference		Poster
Holvoet, K., Vereecken, H., Devroede, N., Ronse, Y., Cauwenberghs, K., Van Assel, J., and Waterschoot, G.	6-7 December 2007	OpenMI helps water managers in the future with integrated water management	Knowledge of Water Systems Conference, Antwerp, Belgium		Poster presentation in Dutch
Moore, R. V., Murphy, H. M.	28/02/2008	OpenMI Association Annual Report			Association Annual Report
Moore, R. V., Murphy, H. M.	30/04/2008	OpenMI Interim Report. October 2006 – March 2008			Customer Report to the European Commission. April 2008
Moore, R. V., Murphy, H. M., Sotiropoulos, E.	April 2008	OpenMI Association poster			Poster
Gijsbers, P.J.A, J.B. Gregersen, P.Sinding, S.Hummel	19-21 May 2008	OpenMI design patterns for river-groundwater interaction	Modflow and More 2008 Conference, organised by IGWMC, Golden, CO		paper accepted for publication in conference proceedings
Gijsbers, P.J.A.	22 May 2008	OpenMI training course	Post-event Modflow and More 2008 Conference, organised by IGWMC, Golden, CO		course
Loukas, A., K. Kokkinos, I. Vasiliades, and A. Liakopoulos (University of Thessaly)	6-10/07/2008	The migration of the UTHBAL hydrologic model into OpenMI	iEMSs 2008 International Congress on Environmental Modelling and Software, Integrating Sciences and Information Technology for Environmental Assessment and Decision Making, 4th Biennial Meeting of iEMSs, Barcelona, Spain		paper submitted for review and possible publication
N. Devroede, Y. Ronse, J. Van Assel and H. Vereecken	6-10/07/2008	Demonstration of Integrated Modeling using the OpenMI in the Scheldt River Basin	iEMSs 2008 International Congress on Environmental Modelling and Software, Integrating Sciences and Information Technology for Environmental Assessment and Decision Making, 4th Biennial Meeting of iEMSs, Barcelona, Spain		paper submitted for review and possible publication

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

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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, Aquafin,
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
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

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Meeting	Date	Host / Venue	Attendees
OpenMI-Life Steering Committee meeting 3	19/04/2007	Aquafin, Aartselaar, 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 Technical Committee meeting 9	7/11/2007	Web meeting	DHI, WSL, WL|Delft
Task C Technical Group Meeting Pinios: Use Case 3	13/11/2007	University of Thessaly, Volos, Greece	UTH
OpenMI Association Technical Committee meeting 10	14/11/2007	Web meeting	DHI, WSL, WL|Delft
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 11	22/11/2007	CEH, Wallingford, UK	DHI, WSL, WL|Delft, 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
OpenMI Association Executive Committee meeting 6	22-23/11/2007	CEH, Wallingford, UK	CEH, RIZA, WL|Delft, DHI, WSL, NTUA, Aquafin, Alterra
OpenMI Association Technical committee meeting 12	10-12/12/2007	Wallingford Software, Wallingford, UK	DHI, WSL, WL|Delft
Task C Technical Group Meeting Pinios: Use Case 2	12/12/2007	NTUA, Athens, Greece	NTUA
Task B Technical meeting Use case 'a'	20/12/2007	Aquafin, Aartselaar, Belgium	Aquafin, VMM-AWA, WSI
OpenMI Association Dissemination Committee meeting 4	09/01/2008	Aquafin, Aartselaar, Belgium	CEH, NTUA, Aquafin, Deltares

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Meeting	Date	Host / Venue	Attendees
Task B, Use case 'd' Technical meeting 5	10/01/2008	Deltares, Delft, The Netherlands	FH, RIKZ, Deltares
OpenMi Association Technical committee meeting 13	16/01/2008	Web meeting	DHI, WSL, Deltares
OpenMi Association Technical committee meeting 14	23/01/2008	Web meeting	DHI, WSL, Deltares
Task B Technical meeting Use case 'a'	01/02/2008	Aquafin, Aartselaar, Belgium	Aquafin, VMM-AWA, WSL
OpenMi Association Technical committee meeting 15	04-06/02/2008	DHI, Hørsholm, Denmark	DHI, WSL, Deltares
Task C Technical Group Meeting Pinios: Use Case 3	14/02/2008	University of Thessaly, Volos, Greece	UTH
Task C Technical Group Meeting Pinios: Use Case 1	22/02/2008	NTUA, Athens, Greece	NTUA
Task B Technical meeting Use case 'a'	03/03/2008	Aquafin, Aartselaar, Belgium	Aquafin, VMM-AWA, WSL
Task C Technical Group Meeting Pinios: Use Case 1	03/03/2008	NTUA, Athens, Greece	NTUA
OpenMi Association Documentation Meeting 2	11/03/2008	Deltares, Delft, The Netherlands	CEH, Deltares, DHI, WSL, Butford Technical Publishing
OpenMi Association Dissemination Committee meeting 5	12/03/2008	Deltares, Delft, The Netherlands	CEH, NTUA, Aquafin, Deltares
OpenMi Association General Meeting 2	13/03/2008	Deltares, Delft, The Netherlands	CEH, RIZA, WLI Delft, DHI, WSL, NTUA, Aquafin
OpenMi Association Executive Committee meeting 7	13/03/2008	Deltares, Delft, The Netherlands	CEH, RIZA, WLI Delft, DHI, WSL, NTUA, Aquafin, Alterra
OpenMi-Life Steering Committee meeting 6	14/03/2008	Deltares, Delft, The Netherlands	CEH, DHI, Deltares, WSL, NTUA, Aquafin, VMM
OpenMi Association Technical committee meeting	14-16/04/2008	Deltares, Delft, The Netherlands	DHI, WSL, Deltares
Task B Technical meeting Use case 'a'	30/04/2008	Aquafin, Aartselaar, Belgium	Aquafin, VMM-AWA, WSL
EU-EPA OpenMi Video Conference	15/05/2008	Video Conference	CEH, DHI WSL Deltares, Aquafin, NTUA, EC, EPA
OpenMi Association Technical committee meeting	02-04/06/2008	WSL, Wallingford, UK	DHI, WSL, Deltares
OpenMi Association EU-NSF Workshop	07-10/04/2008	CEH-WSL, Wallingford, UK	CEH, DHI, WSL, Deltares
Task B Technical meeting Use case 'a'	20/05/2008	Aquafin, Aartselaar, Belgium	Aquafin, VMM-AWA, WSL
CEH Workshop on the OpenMi	05/06/2008	CEH Wallingford, UK	CEH, DHI, WSL
OpenMi Association Dissemination Committee meeting 6	25/06/2008	NTUA, Athens, Greece	CEH, NTUA, Aquafin, Deltares
OpenMi-Life Steering Committee meeting 7	26/06/2008	NTUA, Athens, Greece	CEH, DHI, Deltares, WSL, NTUA, Aquafin, VMM
OpenMi Association Executive Committee meeting 8	11/07/2008	Barcelona, Spain	CEH, RIZA, WLI Delft, DHI, WSL, NTUA, Aquafin, Alterra
OpenMi Association Technical committee meeting	08-10/09/2008	WSL, Wallingford, UK	DHI, WSL, Deltares
OpenMi-Life Steering Committee meeting 7	30/09/2008	CEH, Wallingford, UK	CEH, DHI, Deltares, WSL, NTUA, Aquafin, VMM
OpenMi Association Dissemination Committee meeting 7	29/09/2008	CEH, Wallingford, UK	CEH, NTUA, Aquafin, Deltares
1st Scheldt OpenMi-LIFE Workshop	24-28/11/2008	VMM, Belgium	Scheldt partners plus outside invited guests
EU-USACE - Workshop	TBA	TBA	TBA

APPENDIX 6 DEFINITION OF OPENMI COMPLIANCE

In the C# code the following statements serve as the key requirements for OpenMI compliance:

§ 1) An OpenMI compliant component must implement the ILinkableComponent interface according to specifications provided as comments in the OpenMI.Standard interface source code.

§ 2) An OpenMI compliant component must, when compiled, reference the OpenMI.Standard.dll, which is released and compiled by the OpenMI Association.

§ 3) An OpenMI compliant component must be associated with a XML file, which complies to (can be validated with) the LinkableComponent.xsd schema.

§ 4) An OpenMI compliant component must be associated with a XML file, which complies to (can be validated with) the OpenMIComplianceInfo.xsd schema. This file must be submitted to the OpenMI Association.

§ 5) The OpenMI Association provides two additional interfaces which OpenMI compliant components may or may not implement; the IManageState interface and the IDiscreteTimes interface. However, if these interfaces are implemented, each method and property must implemented according to the comments given in the OpenMI.Standard interface source code.

§ 6) The OpenMI Association's downloadable standard zip file provides the only recognized version of source files, xml schemas and assembly file.

Similar rules also apply to the Java implementation.

The OpenMI Standard consists of four enumerations and twenty four interfaces which together define ninety six methods or properties). Each of these methods/properties is, with the 1.4 release, unambiguously defined in the source code.

APPENDIX 7 NEW PLANNING AND TIMING
FOR THE SCHELDT USE CASE C

The Univiersity of Liege plan to resume work on the OpenMI-Life project on 1st April 2008. The following revisions to the original plan are proposed.

Part of task B1 (migration and installation):

- migration of the PEGASE model from the UNIX environment to the Windows environment : to be completed by 30th June 2008,
- migration of the PEGASE model making it OpenMI compliant : to be completed by 31st August 2008,
- installation of the associated models Infoworks RS and MIKE11, OpenMI compliant in the most updated version, at the ULG and the VMM : to be completed by 8th September 2008,

Part of task B2 (trial of integrated modelling):

There are several sub use cases involved:

- an unidirectional link in some nodes between the PEGASE model of the river Dijle catchment and the Infoworks RS model of the river Dijle ; limited to the part upstream the city of Leuven,
- an unidirectional link in some nodes between the PEGASE model of the river Dijle catchment and the MIKE11 model of the river Dijle,
- an unidirectional link in all nodes between the PEGASE model of the river Dijle catchment and the MIKE11 model of the river Dijle,
- a bidirectional link in all nodes between the PEGASE model of the river Dijle catchment and the MIKE11 model of the river Dijle.

For each sub use case, the following steps have to be achieved:

- to assess the links between the models,
- to perform runs in stand alone mode,
- to use the results of the associated model as input data for runs in stand alone mode,
- to link the models and to perform runs in linked mode,
- to solve the problems, encountered during the tests,
- to validate the models, running in linked mode.

Revised planning and timings proposed for task B2:

- to perform sub use case 1 (an unidirectional link in some nodes between the PEGASE model of the river Dijle catchment and the Infoworks RS model of the river Dijle ; limited to the part upstream the city of Leuven): to be completed on November 30th 2008 ,

- to perform sub use case 2 (an unidirectional link in some nodes between the PEGASE model of the river Dijle catchment and the MIKE11 model of the river Dijle): to be completed on January 31st 2009,
- to perform sub use case 3 (an unidirectional link in all nodes between the PEGASE model of the river Dijle catchment and the MIKE11 model of the river Dijle): to be completed on March 31st 2009,
- to perform sub use case 4 (a bidirectional link in all nodes between the PEGASE model of the river Dijle catchment and the MIKE11 model of the river Dijle): to be completed on April 30th 2009.

Part of task B3 (Demonstrate under operational conditions):

- There are two management / policy issues defined for this use case :
- the river flow regulation on the river quality,
- • simulations of high flow situations,
- • simulations of low flow situations.
- the impact of the river quality at flooding.

For each management / policy issue, the following steps have to be achieved:

- to carry out runs in operational mode,
- to evaluate the performance and stability in operational mode,
- to perform the required changes to the models and to the information environment,
- to repeat the operational runs after changes in place.

The next planning and timing are proposed for task B3:

- to perform the simulations for solving the first management / policy issue (the river flow regulation on the river quality) : to be completed on August 31st 2009,
- to perform the simulations for solving the second management / policy issue (the impact of the river quality at flooding): to be completed on October 31st 2009.

Part of task B4 (Evaluate operational use):

- to evaluate the results of integrated simulations in terms of objectives, questions answered, improved insight in process interactions,
- to evaluate the added value of integrated modelling as compared to the use of several solely models, in view of better integrated water management,
- to evaluate the OpenMI technological issues in view of performance and stability,
- to evaluate the working of the OpenMI support structure in view of flexibility, time of response etc.

All to be completed by 31st January 2010.

APPENDIX 8 OPENMI ASSOCIATION DISSEMINATION COMMITTEE TERMS OF REFERENCE

1. Mission Statement

The Dissemination Committee is responsible to the OpenMI Association Executive Committee (OAEC) for the dissemination of information about the OpenMI and its promotion across the world. The Dissemination Committee develops and implements the dissemination plan, which will cover (within the limits of available financial and human resources) scientific, technical and popular publications, press articles, conferences and workshops, training promotion, feedback procedures and the design and maintenance of the Association's website at www.openMI.org.

2. Problem Statement

The OpenMI was developed during the HarmonIT research project, which was supported by the European Commission under the Fifth Framework Programme. The initial objective of OpenMI was to facilitate the linking of hydrology related models and assist the strategic planning and integrated catchment management required by the Water Framework Directive. The great potential of OpenMI to become a European and Global standard for component linking (which would be particularly useful in the environmental domain) was evident as soon as HarmonIT was over and the project's results were reviewed and evaluated. Transforming OpenMI from research output to a sustainable operational product of international standing requires a combined approach that will address the technological as well as the communication aspects. The Dissemination Committee will oversee, support, and guide the communication/promotion of OpenMI to the interested model developers and end users ensuring that: a. the capabilities of the OpenMI as well as the current developments become known to the interested parties and b. the multiple perspectives and interests of the greater OpenMI community are communicated to the OpenMI Executive Committee so that OAEC will be able to respond to the priority needs of the OpenMI community.

3. Boundaries

o The Dissemination Committee is a sub-committee created after a decision of the OpenMI Association Executive Committee.
o During its term, the OpenMI Dissemination Committee may deliberate freely and in total independence for issues related to its mission statement, that is analyze, develop, and implement the OpenMI promotion
o The OpenMI Association Executive Committee has the right to disband the Dissemination Committee when the pursuit objectives of the Dissemination Committee do not serve anymore the strategy of the Association.
o The authority and powers delegated to the Dissemination Committee can not exceed or contradict those permitted by the Law or the Charter of the Association.

4. Specific Issues to Be Addressed

• Examine how the varying interests of model developers, model end-users, and managers will be best addressed by organizing representative Dissemination Committees with members of varying expertise
• Review and establish procedures to achieve the dissemination components mentioned in the mission statement
• Update and maintain an OpenMI contact list
• Collect systematically information from OpenMI members to regularly update the OpenMI website
• Plan ahead for the OpenMI electronic Newsletter content and produce the Newsletter in a timely manner

• Keep a list of interesting conferences to participate and inform OpenMI members for relevant dates of importance (such as abstract submission deadlines and conference dates)
• Liaise with conference coordinators to organize OpenMI sessions

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- Coordinate the provision/ production of posters, leaflets, repository of pictures with the support of OpenMI Association members
- Develop indicators to monitor progress and adjust plans as appropriate
- Make recommendations to the OpenMI Association Executive Committee regarding the desirability or feasibility of activities that involve the support and/or contribution of people outside the OpenMI Dissemination Committee

5. Desired Outcomes

- Identify and review on a regular basis the greater community with current and potential interest in OpenMI
- Identify and update regularly the most effective media for communication with each group within the OpenMI community
- Maintain and extend awareness of OpenMI in its potential European and Global user communities
- Incorporate in the dissemination programme opportunities for external evaluation and feedback

6. Persons Involved

- All members of the OpenMI Dissemination Committee will be members of the OpenMI Association. Subject to prior approval by the OpenMI Association Executive Committee, external experts which are not members of the OpenMI Association can be invited to contribute in specific tasks and participate with a right to vote in the relevant meetings.
- The Dissemination Committee will consist of no more than ten (10) members and no less than three (3) members
- The Chair of the Dissemination Committee will be appointed by the OpenMI Association Executive Committee to serve for three (3) years (renewable).
- The Chair of the Dissemination Committee will be responsible for the selection of a Vice Chair/ Secretary as well as an adequate group of Dissemination Committee members to achieve the dissemination tasks.
- In case of member withdrawal or inability to form an adequate Dissemination Committee team to support the Dissemination Committee's objectives, the OpenMI Association Executive Committee, after the request of the Dissemination Committee Chair, may apply to specific OpenMI Association members to serve as Dissemination Committee members until the end of the 2-year term.
- The Chair will be responsible for the following:
  - o Chairing the OpenMI Dissemination Committee sessions
  - o Representing the OpenMI Dissemination Committee to the OpenMI Association Executive Committee
  - o Ensuring that the appropriate deliverables are produced and presented to the OpenMI Association Executive Committee
- The Vice Chair/ Secretary will assist the Chair to carrying out the above responsibilities

7. Administration Issues

a. Timeframes

- A Chair of the OpenMI Dissemination Committee is nominated and appointed every three (3) years, at the 1st OpenMI Association Executive Committee meeting of the respective calendar year
- Between the time of appointment and one (1) month after, a complete list of the new OpenMI Dissemination Committee members must be presented to the OpenMI Association Executive Committee

- The OpenMI Association Executive Committee should be informed at its next meeting about any OpenMI Dissemination Committee member addition or withdrawal

b. Meetings

- The Dissemination Committee shall meet once per year plus whenever a meeting is requested by the majority of the members. The one (1) standard

meeting shall be in-person while other meeting(s)-follow ups may also be conducted through teleconferences.

- The meetings should be convene at least one month in advance. In case of urgency (decided by the Chair of the Dissemination Committee), shorter notice may be given
- Any Dissemination Committee member or current external expert may suggest a topic to be included in the forthcoming meeting agenda
- The Dissemination Committee may take decisions only when at least half of the members are present
- Decisions of the Dissemination Committee will in principal be taken by consensus. In the absence of consensus, a two thirds majority of members and external experts present will be adopted (but recorded in the Minutes of the meeting)
- Voting by proxy is allowed (but recorded in the Minutes of the meeting)

c. Reporting Guidelines
- The Minutes of the OpenMI Dissemination Committee meetings will be posted at the Members-Only Area of the OpenMI Association website
- The Chair of the OpenMI Association Dissemination Committee will present, either in person or in the form of written communication, the dissemination progress at the relevant meetings of the OpenMI Association Executive Committee
- One (1) month before the end of the three (3) year term, the OpenMI Dissemination Committee should provide a brief report to the OpenMI Association Executive Committee stating the goals and deliverables of their service period as well as any future promotional plans and suggestions

d. Resources
- The Dissemination Committee will suggest to the OpenMI Association Executive Committee the necessary human and financial resources required to perform the various recommended tasks
- Depending on availability and importance of pending tasks, the OpenMI Association Executive Committee may satisfy part or whole of the requests or suggest alternative ways to sponsor the dissemination efforts.

APPENDIX 9 THE OPENMI ASSOCIATION CHARTER

Foundation of an Association: Charter Articles

On this date, June fourth two thousand and seven, appeared before me, Eddy Dick de Jongh, L.L.M., civil-law notary practising in Dronten:

1. Mr. Ir. **Michiel Willem Blind**, born in Hendrik Ido Ambacht (The Netherlands) on the sixth day of September, nineteen hundred and sixtyeight, residing in (8212 WB) Lelystad (The Netherlands), Hofstede 5, not married and not registered as a civil-law partner, whose identity was established by me, civil-law notary, by means of passport with number NJ7356667, issued in Lelystad on the twenty-sixth of June two thousand six.

2. Mr. Dr. Ir. **Peter Johan Albert Gijsbers**, born in Nijmegen (The Netherlands) on the twenty-first day of November nineteen hundred and sixty-nine, residing in (2613 TE) Delft (The Netherlands), Buitenwatersloot 193, not married and not registered as a civil-law partner, whose identity was established by me, civil-law notary, by means of passport with number NH7744318, issued in Delft on the twenty-fifth of February two thousand five.

3. Mr. **Roger Vernon Moore**, born in Reading (the United Kingdom) on the twenty third day of November nineteen hundred and forty five, residing in Day's Cottage, Ewelme, Wallingford, Oxon, OX10 6HU, United Kingdom, married, whose identity was established by me, civil-law notary, by means of a passport with number 203166757, issued by the United Kingdom Passport Authority on the thirteenth day of November two thousand and one.

The persons appearing stated that they wished to form an association with the following Charter:

Notes

NAME

Article 1

The Association carries the name: The OpenMI Association.

REGISTERED OFFICE AND DURATION

Article 2

The Association has its Registered Office in Delft and has been formed for an indefinite period of time.

OBJECTIVE

Article 3

1   The objective of the Association is: The promotion of the development, use, management and maintenance of the Open Modelling Interface (the OpenMI), a standard for the exchange of data between computer software in environmental management.

2   The Association seeks to achieve this goal, amongst other things, by:

- Exchanging information with regard to the standard specified in the objective, in word, writing and by means of electronic devices such as a website, both within the Association and with other organisations which pursue a similar objective

- Stimulating the maintenance and development of the OpenMI standard and its supporting software and managing their release

- Stimulating the provision of information and promoting discussion on OpenMI in Europe and across the world by the organising and/or participating in events

- All that which may be further conducive to the objective

MEMBERS

Article 4

1   The following persons/parties are eligible for the membership of the Association:

- Institutes or organisations that are legal entities and make direct or indirect use of the OpenMI

- Natural persons who have reached the age of eighteen

- Those who applied to the Committee and have been admitted to the Membership, unless a General Meeting issued a halt on the recruitment of new members

2   The membership is personal or in the case of a legal entity strictly reserved for the legal entity in question. The membership, therefore, cannot be transferred nor is it eligible for acquisition by hereditary succession.

3   The Committee will keep a register that includes the names and addresses of all members.

TERMINATION OF MEMBERSHIP

Article 5

1   The membership ends:

a) By death or, if the member is a legal entity, by its dissolution.

b) By the member's written notice of termination to the secretary.

c) By termination by the Association. Such termination can take place if a member no longer meets the membership requirements set out in this Charter, if a member fails to fulfil his or her obligations vis-à-vis the Association, or if the Association can no longer be reasonably required to let the membership continue.

d) By expulsion. An expulsion can only be issued if a member has acted in a way which is contrary to the Association's Charter, regulations or resolutions, or if he or she has unreasonably damaged the Association's interests.

2 Termination required by the Association is enforced by the Committee.

3 Termination of the membership by a member or the Association takes effect at the end of an Association year, subject to four weeks' notice.

However, the membership can be terminated with immediate effect if the Association or the member cannot reasonably be required to let the membership continue.

4 Any termination that contravenes the provisions set out in the previous paragraph will take effect at the earliest permissible time following the date on which the termination was set to take effect.

5 Immediate termination of membership is permitted:

a) Within one month after a resolution becomes known or is communicated to the member, in which the members' rights are limited or their duties are increased. The resolution, in that event, will not apply to the member. However, a member is not permitted to evade a resolution in which the members' monetary obligations are increased on his or her membership.

b) Within one month after a resolution seeking to convert the Association into a different legal entity or to effect a merger, is communicated to the member.

6 Expulsion from the membership is effected by the Committee.

7 In the event of the Committee's decision to terminate the membership – or to do so based on the ground that the Association cannot be reasonably required to let the membership continue, or in the event of a decision by the members to expel a member – the person/party in question can appeal within one month of receiving the decision's notification. To this end, the aforementioned person/party will be notified of the decision in writing forthwith, stating the reasons. The member is suspended during the term of appeal and pending the appeal.

The General Meeting will confirm the termination or expulsion by a closed ballot in which there must be a two-thirds majority in favour of the termination or expulsion.

8 If the membership ends during an Association year, the annual fee will nevertheless still be due in its entirety.

9 In the event of a member's termination of membership, or his or her expulsion from the membership by the Committee, the former member cannot claim any refund of the membership fee and/or the admission fees.

ANNUAL CONTRIBUTIONS/ADMISSION FEES

Article 6

1 The members are obliged to pay an annual membership fee, which is to be established by the Committee. To this end, the members can be divided into categories who each pay a different fee.

2 The Committee is authorised – in special circumstances – to grant a complete or partial exemption from the payment of fees during the months of July up to December inclusive.

3 The member is obliged to pay the annual fee not later than by the first day of January of each Association year.

4 The General Meeting is authorised to decide – be this or be it not at the behest of the Committee – that certain categories of membership candidates are obliged to pay a once-only admission fee, which sum will be established by the General Meeting.

During the months of July up to December inclusive, the Committee can, in special circumstances, grant full or partial exemption from the obligation to pay the admission fee.

5 A membership fee established by the Committee pursuant to this article must first be approved by the General Meeting, in accordance with the provisions set out in this Charter with regard to decision-making in the General Meeting.

COMMITTEE

Article 7

1 **a)** The Committee, with the exception of the in first in position appointed Committee, consists of an uneven number of at least three natural persons or legal entities and a maximum of seventeen natural persons or legal entities.

The appointment takes place from the members' midst, except for the provisions set out in paragraph 2.

b) The following persons/parties cannot be appointed as Committee Members:

- Any person or party who has been declared bankrupt

- Any person or party who has applied for a moratorium on payments, or who has been placed under guardianship or administration

The Committee may comprise between 3 and 17 people.

Standing Orders can reduce this number but cannot increase it

- Any person or party who has applied for admittance to a debt rescheduling arrangement as referred to in the Netherlands Bankruptcy Act

2 The appointment of Committee Members takes place on one or more binding recommendations, except for the provisions set out in paragraph 4.

Both the Committee and two members are authorised to draw up such a recommendation, on the understanding that a maximum of two (2) prospective Committee Members can be recommended by each member of the Association.

The Committee's recommendation is communicated at the convocation of the meeting. A recommendation by two or more members must be submitted to the Committee in writing prior to the commencement of the meeting.

3 The binding nature of any recommendation can be removed by a resolution taken at the General Meeting which is adopted by at least two-thirds of the votes cast, at a meeting in which at least two-thirds of the members are represented.

4 If no recommendation has been drawn up, or if the General Meeting resolves to remove the binding nature of the drawn-up recommendations in accordance with the previous paragraph, the General Meeting is free to choose.

5 If there is more than one binding recommendation, the appointment will take place from these recommendations.

6 The expenses incurred by Committee Members in the fulfilment of their duties can – after the Committee's prior approval of the activity in question – be reimbursed by the Committee. The Committee can set out further regulations with regard to the abovementioned reimbursement in the standing orders.

TERMINATION OF COMMITTEE MEMBERSHIP, PERIODICAL MEMBERSHIP, SUSPENSION

Article 8

1 Every Committee Member – even if he or she has been appointed for a definite period of time – can be suspended or dismissed at any time by the body that appointed him or her.

A suspension that is not followed by a decision to dismiss within three months, ends when this term lapses.

2 **a)** 1/3rd of the Committee Members will resign not later than one (1) year after the appointment of the Committee.

If the total number of Committee Members does not equal three or a multiple of three, a number of Committee Members that is closest to 1/3rd part will resign, such in accordance with the rotation schedule to be drawn up by the Committee.

The resigned member is eligible for reappointment, except for the provisions set out in Article 7(1)(b).

Any person or party who is appointed to a temporary vacancy, takes up his or her predecessor's place in the schedule.

b) Contrary to the provisions set out in Article 7 and Article 8(2)(a), the Committee Members appointed for the first time, as referred to in Article 19, will resign not later than three (3) years after their appointment.

3 The Committee Membership also ends:

a) With regard to a Committee Member who was appointed from amongst the members, by the termination of membership of the Association

b) By written termination, subject to at least two months' notice

c) Because of the circumstances referred to in Article 7

COMMITTEE POSITIONS, DECISION-MAKING BY THE COMMITTEE

Article 9

1 The Committee will choose a Chairman, a Vice-Chairman, a Secretary and a Treasurer from its midst, who will jointly form the Managing Committee with authority to take action in the name of the Committee on the basis of decisions supported by a majority of its members. The Managing Committee can appoint a replacement from its midst. A Committee Member can hold more than one position.

2 The Secretary will keep minutes of the proceedings at every meeting which will be adopted at the next meeting and, after adoption, signed by both the Chairman and the Secretary.

3 The opinion given by the Chairman regarding the outcome of a vote, and the contents of a decision, is binding.

4 It is possible to set out further rules regarding the Committee's meetings and decision-making in the standing orders.

COMMITTEE'S DUTY, REPRESENTATION

Article 10

1 Except for the limitations set out in this Charter, the Committee is charged with the management of the Association.

2 If the number of Committee Members falls below the required statutory minimum of Committee Members, the Committee will retain its powers. However, the Committee is obliged to convene a General Meeting forthwith, at which Meeting the filling of the vacancy/vacancies will be discussed.

3 The Committee is authorised – within its own sphere of responsibility – to have certain parts of its task carried out by (sub) committees to be appointed by the Committee.

The Committee is authorised to revoke the management tasks delegated to the committees at all times, and to carry them out itself.

4 The Committee is authorised – subject to the General Meeting's approval – to make decisions to enter into contracts for the acquisition, alienation and/or encumbrance of registered property, and into contracts in which the Association commits itself as a joint and several co-debtor, acts as a guarantor for a third party, or stands surety for a third-party debt.

The absence of the aforementioned approval can be invoked against third parties.

5 The Committee also requires prior approval from the General Meeting for decisions that seek to effect:

I Without prejudice to the provisions set out under II, the performance of juridical acts and the making of investments that exceed a sum or value to be annually established by the General Meeting.

II a) The letting, letting out, leasing and obtaining and granting the use or enjoyment of registered property in any other manner.

b) The conclusion of contracts in which the Association is granted a bank credit.

c) Giving money on loan, as well as withdrawing money as a loan, which does not include the use of a bank credit granted to the Association.

d) The reaching of settlements.

    e)   The instigation of legal proceedings, including the commencement of arbitration proceedings, with the exception of the implementation of protective and/or legal measures that cannot be postponed.

    f)   The conclusion and adjustment of employment contracts. The absence of the aforementioned approval cannot be invoked against third parties.

6   Without prejudice to the provisions set out in the last sentence of paragraph 4, the Managing Committee represents the Association judicially and extra-judicially.

7   The representative authority also belongs to two Members of the Managing Committee, acting jointly.

As regards the representative authority as referred to in Article 10(6), they can be represented by an authorised representative, bearing a written power of attorney, on the understanding that this can only take place within limits that are specifically defined in the power of attorney.

8   The Committee can – without approval from the General Meeting – be represented in law by a solicitor engaged by the Committee.

ANNUAL REPORT, RENDERING ACCOUNT

Article 11

1   The financial year and the Association year coincide with the calendar year.

2   The Committee is obliged to keep records of the Association's financial position and activities – in accordance with the requirements resulting from these activities – and keep books, documents and other information carriers, in such a manner that the Association's rights and obligations can be known from them at any time.

3   Every year, within six months of the end of the Association year – except if there is an extension of this term granted by the General Meeting – the Committee will issue its annual report on the state of affairs within the Association and the policy that has been conducted. The Committee will submit the balance sheet and the statement of income and expenditure for approval by the General Meeting. These documents will be signed by all the Committee Members; if any signature is missing, the reason for this omission will be given. After the expiry of this term, every member can claim from the joint Committee Members in law that they fulfil these obligations.

4   If no audit opinion regarding these documents' accuracy, as referred to in Article 2:393(1) of the Netherlands Civil Code, is presented to the General Meeting, then the General Meeting each year will appoint a committee which consists of at least two members who cannot be Committee Members.

5   The Committee is obliged to provide this committee with all the information that the latter requires for its audit and – if necessary – show the committee the Association's cash and assets, and render all the Association's books, documents and other information carriers available for inspection.

6 The committee audits the documents referred to in Paragraphs 3 and 5, and reports on its findings to the General Meeting. If the audit of the accounts to be rendered requires special accounting expertise, the committee can be assisted by an expert.

7 The Committee is required to keep the documents, books and other information carriers, as referred to in Paragraphs 2 and 3, in its custody for a period of seven years.

GENERAL MEETINGS

Article 12

1 The General Meeting has all powers within the Association that have not been granted to the Committee by law or in this Charter.

2 A General Meeting – the annual meeting – is held every year, and not later than six months from the end of the Association year. The following items will, amongst other things, be discussed at this annual meeting:

    a) The annual report and the accounts to be rendered pursuant to Article 11, which also includes the report to be issued by the committee appointed in the aforementioned article.

    b) Granting a discharge from liability to the Committee Members for their management as conducted during the Association year in question, insofar as this management is revealed from the annual report and rendered accounts, or if such management has been disclosed to the General Meeting in any other way.

    c) The appointment of the committee referred to in Article 11 for the next Association year.

    d) Filling possible vacancies.

    e) Recommendations by the Committee or the members, as announced at the convocation of the meeting.

3 Other General Meetings will be held as often as considered desirable by the Committee.

ACCESS AND VOTING RIGHTS

Article 13

1 All members of the Association will have access to the General Meeting. No access will be granted to suspended members and suspended Committee Members, on the understanding that a suspended member is permitted to attend the meeting at which the decision for his or her suspension will be discussed. This member will also be authorised to take the floor at this meeting.

2 The General Meeting decides on the admittance of persons other than those referred to in Paragraph 1.

3 Every Association member can cast one vote; suspended members will not have a right to vote.

4   A member may have a representative, bearing a written proxy cast his or her vote, on the understanding that the aforementioned representative can cast no more by item in each meeting than a total of two votes.

On any given issue a proxy may only cast votes on behalf of one or two people, i.e. a proxy can only represent more than two people so long as no more than two of them wish to vote on a particular issue.

5   Members will not have the right to vote on matters that relate to themselves, their spouses or any of their relations by blood or affinity in the direct line.

CHAIRMANSHIP, MINUTES

Article 14

1   The General Meetings are led by the Association's Chairman or his or her deputy. If the Chairman and his deputy are absent, then one of the other Committee Members – to be appointed by the Committee – will act as Chair. If the Chairmanship can also not be provided for in this manner, the meeting will choose its own Chair.

2   The Secretary, or another person to be appointed by the Chair, will keep minutes of the proceedings at every meeting, which will be adopted at the same or the next meeting. After adoption, both the Chairman and the Minutes Secretary will sign the minutes. The parties convening the meeting can have an official notary's record drawn up of the proceedings. The members will be notified of the contents of the minutes or the official notary's record.

DECISION-MAKING BY THE GENERAL MEETING

Article 15

1   The opinion given by the Chair at the General Meeting with regard to the outcome of a vote, is binding. The same applies to the contents of an adopted resolution, insofar as this involves a vote on a proposal that was not set out in writing.

2   If – immediately after the opinion as referred to in the first paragraph is issued – the accuracy thereof is disputed, there will be a new vote if so requested by at least three (3) persons entitled to vote, present at the meeting. This also applies if the original vote did not take place by roll call or in writing. This new vote cancels the legal effects of the original vote.

3   Insofar as not stipulated otherwise in this Charter, all resolutions of the General Meeting are adopted by an absolute majority of the valid votes cast.

4   Blank votes will be considered as not having been cast.

5   If no candidate obtains an absolute majority at a vote on persons, there will be a second vote, or – in the event of a binding recommendation – a second vote between the recommended candidates.

If no candidate obtains an absolute majority at the second vote, there will be re-votes until either a candidate obtains an absolute majority or – in the event of a vote between two persons – there is a tie. With the aforementioned re-votes (not including the second vote) there will each time be a vote between all persons who gathered votes at the previous vote. However, this excludes the person who amassed the smallest number of votes at this previous vote. If this smallest number of votes was amassed by more than one person at this previous vote, the person to be excluded from the new vote will be decided upon by drawing lots.

If there is a tie when voting between two persons, it will be decided by drawing lots which one of the two candidates is to be chosen.

6   If there is a tie when voting on a proposal that does not involve the appointment of persons, then the proposal will be considered as having been rejected.

7   All votes take place orally or by a show of hands, unless the Chair, or at least one/third (1/3rd) of the total number of members entitled to vote, deems a written vote necessary. A written vote takes place by means of unsigned, closed ballots. It is possible to adopt resolutions by acclamation, unless a person entitled to vote requires a vote by roll call.

8   A unanimous resolution by all members – even when they have not convened in a meeting – will have the same effect as a resolution by the General Meeting, as long as it was adopted with the prior knowledge of the Committee.

9   As long as ten members or one/third of the total number of members are present or represented at a General Meeting, valid resolutions can be adopted on all items that are discussed – with the exception of a proposal for an amendment to the Charter or for dissolution pursuant to Article 17 or 18 – even if (a) no convocation has taken place, (b) such convocation did not take place in the prescribed manner or (c) any other regulation regarding the convening and holding of meetings (or a related formality) was not observed.

10   If the required number of members – as referred to in Article 15(9) – is not present within thirty (30) minutes after opening the General Meeting, then the Committee is authorised to postpone the General Meeting until a later date to be set by the Committee, such in accordance with the provisions set out in this Charter with regard to the postponement and convocation of the General Meeting.

CONVOCATION OF THE GENERAL MEETING

Article 16

1   The Committee convenes the General Meetings. The convocation takes place in writing and will be sent to the members' addresses as included in the Members' Register referred to in Article 4. The convocation takes place not later than the seventh day prior to the date of the meeting.

2   The convocation notice will state the items to be discussed, and the place, date and time of the meeting, without prejudice to the provisions set out in Article 17.

3   The Committee is also obliged – at the written request of at least ten (10) members or one/third (1/3rd) of the total number of members – to convene a General Meeting at a term that may not exceed a period of four weeks after the request was made. If the request is not met within fourteen days, the applicants can convene the meeting themselves by means of a convocation in accordance with this article.

4   With the exception of a General Meeting that has been convened pursuant to Article 16, the Committee can postpone a General Meeting that it has convened itself for a period of no more than twenty-one (21) days after the original date of the meeting.

5   The Committee is obliged to notify the members who are entitled to vote of a General Meeting that was postponed pursuant to Article 16(4) and to convene a new General Meeting, such in accordance with the provisions set out in this Charter with regard to the convocation of the General Meeting.

AMENDMENT TO THE CHARTER

Article 17

1   The Association's Charter cannot be amended other than by a resolution adopted by a General Meeting, which was convened with the notification that amendments to the Charter will be discussed at this particular meeting.

2   The persons or parties who convened the General Meeting at which a proposal for an amendment to the Charter will be made, must make a copy of this proposal available in both the Dutch and English languages, including the verbatim text of the proposal, available for inspection by the members at a designated location. This must be done at least fourteen days prior to the meeting, and the aforementioned copy must remain available until the end of the day on which the meeting is held.

    Furthermore, the aforementioned copy must be sent to all the members.

3   A resolution for any amendment to the Charter can only be adopted with a majority of at least two-thirds of the valid votes cast in a meeting at which at least two-thirds of the members are present or represented. If two-thirds of the members are not present or represented, a second meeting will be convened and held within four weeks. At this second meeting, a resolution can be adopted regarding the proposal that was discussed at the previous meeting – regardless of the number of members who are present or represented – as long as the resolution is adopted with a majority of at least two-thirds of the valid votes cast.

4   An amendment to the Charter will not take effect until a notary's deed has been drawn up thereof. Every Committee Member is authorised to have this deed executed.

DISSOLUTION

Article 18

1   The Association can be dissolved by a resolution adopted by the General Meeting. The provisions set out in Paragraphs 1, 2 and 3 of the previous article apply by analogy.

2   The Committee effects the winding-up.

3   The General Meeting establishes the allocation of a possible positive balance, on the understanding that the positive balance may only accrue to a legal entity, institute or organisation:

   • Whose objective is similar to that of the Association; and

   • Whose Charter prohibits making distributions to its members in any form.

   The liquidators will transfer the positive balance for this purpose.

4   The winding-up concludes at the time at which there are no more assets known to the liquidator.

5   In the event of a winding-up, the Association ceases to exist as soon as the winding-up ends. The liquidators will send a notification thereof to the registers which the Association has been entered into.

STANDING ORDERS

Article 19

1   The Committee is authorised to adopt standing orders that provide for subjects that require (further) regulation in the opinion of the Committee.

2   Such standing orders cannot be contrary to the law or this Charter.

3   The Committee is authorised to amend or cancel the standing orders.

Finally, the persons appearing declared that – contrary to the provisions set out above under Articles 7 and 8 – the following persons will be appointed as Committee Members for the first time:

a) **Mr. Roger Vernon Moore**, representing the National Environment Research Council, United Kingdom as Chairman

b) **Mr. Michiel Willem Blind,** The Netherlands as Secretary

c) **Mr. Peter Johan Albert Gijsbers**, representing WL| Delft Hydraulics as Treasurer

d) **Mr. Jan Børge Gregersen**, representing DHI Water and Environment as Committee Member

e) **Mrs. Maria Mimikou** as Committee Member

f) **Mr. David John Fortune** representing "Wallingford Software Ltd, duly mandated to act on behalf of the whole HR Wallingford Group of Companies"

A translation in Dutch of the statutes has been attached to this certificate. In case of differences of interpretation the English text is ruling, but only if not in defiance of compelling Dutch Law.

GENERAL TERMS/LIMITATION OF LIABILITY

The services to be provided by the civil-law notary are governed by the General Terms as used by the civil-law notary, which terms include a limitation of liability. The civil-law notary has provided the parties with a copy of these General Terms.

CHOICE OF DOMICILE

The Parties declared that they had chosen the offices of this deed's custodian as the domicile for the fulfilment of this deed, and for the tax consequences thereof.

CONCLUSION OF THE DEED

WHEREOF THIS DEED, which was drawn up in one original copy and executed in Dronten on the date stated at the beginning of this deed.

The persons appearing are known to me, civil-law notary. The substance of this deed has been communicated and explained to them. The persons appearing declared that they did not require a full reading of the deed, that they had received a draft deed prior to its execution in good time, that they had taken cognisance of the deed's contents, and that they agreed thereto and had been offered an explanation of the consequences that result for the parties from this deed.

After a limited reading, this deed was immediately signed, first by the persons appearing and subsequently by me, civil-law notary, at

Signed by the persons appearing and the civil-law notary.

ISSUED AS A TRUE COPY

APPENDIX 10 THE OPENMI ASSOCIATION STANDING ORDERS

Standing Orders of the OpenMI Association

Definitions & Clarifications

Unless otherwise specified, 'in writing' means:

- A letter signed by the responsible person
- A facsimile signed by the responsible person
- An email originating from the e-mail address listed in the Register

When reference is made to an article, this reference is made to an article of the OpenMI Association Charter

The title "Executive Committee" used in these Standing Orders refers to "The Committee" in the OpenMI Association Charter. "Executive Committee" is the preferred title for use in the Association.

Cross-reference to Charter

ADMISSION OF NEW MEMBERS

Article 4

1 Form of Application

1.1 An application for membership must be:

  a) In writing in a form approved by the Executive Committee

  b) Signed by the applicant

  c) Accompanied by such documents or evidence as to qualification for the type of membership applied for as the Executive Committee determine

1.2 An application form should be accompanied by:

  a) The application fee, if any   Article 6

  b) The annual subscription   Article 6

2 Admission to Membership

2.1 As soon as practical after the Association receives an application for membership which satisfies the requirements of Charter Article 4:

  a) The Association must notify the applicant of admission in writing and provide a receipt for any application fee or annual subscription received.

  b) If necessary, an invoice for the membership fee should be sent.

  c) The name and details of the applicant must be entered in the Register.   Article 4.3

3   Register of Members

3.1   Each member must notify the Secretary in writing of any change to their Register entry within one (1) month.

3.2   The Register should contain:

    a)   The full name of the member

    b)   Contact details in a form decided by the Executive Committee

    c)   The membership category

    d)   The dates of admission to and cessation of membership

    e)   The date of last payment of the member's annual subscription

    f)   The membership ID as allocated

    g)   Such other information as the Executive Committee requires

DISCIPLINE

4   Disciplining Members

4.1   If a resolution of the nature referred to in Article 5 of the Charter is to be decided, the Secretary must give the member at least fourteen days' notice of the meeting at which the decision will be made of:

    a)   The meeting

    b)   The allegation against the member

    c)   The intended resolution

    d)   The power of the General Meeting to deal with the matter if the member does not appear

4.2   At the General Meeting and before the matter is decided the member may:

    a)   Give orally or in writing any explanation the member thinks fit; and

    b)   Call a maximum of three witnesses in the member's defence.

4.3   At the General Meeting a member is not entitled to be represented legally or in any other way unless the General Meeting or the Executive Committee, as appropriate, decide otherwise, except for an organisational member, who may be represented by his/her nominated representative.

4.4   If at the General Meeting, the meeting finds against the member, the member may address the Executive Committee regarding the penalty, prior to any penalty being imposed.

4.5   The decision reached at the General Meeting, and the reasons for this decision, will be incorporated into the minutes of the General Meeting.

4.6   Except where required by law, all communications and representations at the General Meeting are confidential and no legal action may be brought in respect of these communications or representations.

REPRESENTATION OF ORGANISATIONAL MEMBERS

5 Representation of Organisational Members

5.1 When appointing a representative, an organisational member may set restrictions on the representative's powers. If the appointment is made based on a position held, the person appointed must identify this position.

5.2 An organisational member may appoint more than one representative but only one representative may exercise the organisation's powers at any one time.

PROXIES

6 Deposit of Proxy and Attorney Implementation

6.1 A document appointing a proxy is not valid unless the document, and the power of attorney or other authority (if any) under which the document is signed or proof of the power or authority to the satisfaction of the Executive Committee is or are deposited at the office of the Association, or at any other place specified for that purpose in the notice convening the meeting no less than twenty-four (24) hours before the meeting is held, or the meeting is adjourned, where the person named in the instrument proposes to vote.

6.2 For the purposes of Article 13.4, it is sufficient if the proxy is received at the Association Secretary's office, provided it has been transmitted by a means of communication approved by the Executive Committee in a reasonably legible form.

7 Proxy Instrument to be in Writing

7.1 A document appointing a proxy must be made in writing by the appointer or of the appointer's attorney who has duly been authorised in writing.

8 Form of Proxy

8.1 The document appointing a proxy must be made in the form determined by the Executive Committee and the form must:

   a) Enable the member to specify the manner in which the proxy must vote with regard to a particular transaction; and

   b) Leave a blank for the member to fill in the name of the person primarily appointed as proxy.

8.2 The form may make provision so that if the member leaves it blank as to which person is primarily appointed as a proxy, or if the person or persons named as proxy fails to attend, the chairman of the meeting is appointed proxy.

8.3 A document appointing a proxy may be in the following form or in a form that is as similar to the following form as the circumstances allow:

I,_____

of _____,

appoint _____

of _____

or, in his or her absence,_____

of _____

as my proxy to vote for me on my behalf at the *annual general / *General Meeting of the Association to be held on the _____ day of _____ 20__ and at any adjournment of that meeting.

This form is to be used *in favour of / *against the resolutions:

1)_____For/Against

2)_____For/Against

3)_____For/Against

4)_____For/Against

5)_____For/Against

Signed on _____ Date _____ day of _____ 20__.

* Strike out whichever is not desired.

To be inserted if desired.

9   Effect of a document appointing a proxy

Article 13.4

9.1 A document appointing a proxy is deemed to confer authority to demand or to join in demanding a poll.

9.2 If a proxy is only for a single meeting it may be used at any postponement or adjournment of that meeting, unless the proxy states otherwise.

9.3 A proxy may be revoked at any time by notice in writing to the Association.

THE EXECUTIVE COMMITTEE

10   Nomination for Election

Article 7

10.1 Nominations for election to the Executive Committee must be made by two members and must:

    a)   Be in writing;

    b)   Be signed by the candidate; and

    c)   Be signed by the proposer and the seconder.

10.2 A nomination for a candidate for election must be received at the office of the Association no later than 5 p.m. on the day that is thirty days prior to the Annual General Meeting at which the candidate seeks election.

10.3 A list of the candidates' names in alphabetical order together with the proposers' and seconders' names must be sent to members with the notice of the Annual General Meeting.

11 Handover of office

11.1 The Executive Committee remains in office until the end of the Annual General Meeting at which point it will hand over to the new committee.

12 Remuneration and Expenses of the Executive Committee

12.1 No member of the Executive Committee may receive any remuneration for his or her services in his or her capacity as a member of the Executive Committee of the Association other than:

12.2   • For the payment of out-of-pocket expenses incurred by the member in the performance of any duty as a member of the Executive Committee of the Association where the amount payable does not exceed an amount previously approved by the Executive Committee of the Association

12.3   • For payment of any service rendered to the Association by the member in a professional or technical capacity, other than in the capacity as a member of the Executive Committee, where the provision of the service has the prior approval of the Executive Committee of the Association and where the amount payable is approved by the Executive Committee of the Association and is on commercially reasonable terms

12.4   • For payment of any monies due to the member as an employee of the Association where the terms of employment have been approved by the Executive Committee of the Association

12.5   • For the provision of a payment of an insurance premium in respect of a contract insuring a member

13 Power to Appoint Deputies for Executive Committee Members

13.1 A member of the Executive Committee may appoint any person approved for that purpose by a majority of the committee, to act as a deputy in place of the appointer whenever the appointer is unable to act personally by reason of illness, absence or any other cause and may do so generally or for a meeting or for any other purpose or for a specified period.

14 Rights and Powers of Deputies

14.1 A deputy is entitled to notice of meetings of the Executive Committee and, if the appointer is not present at such a meeting, is entitled to attend and vote in his or her stead.

14.2 A deputy may exercise any powers that the appointer may exercise and the exercise of any power by the deputy is deemed to be the exercise of the power by the appointer.

14.3 A deputy is not taken into account for the purpose of the number of Executive Committee members.

15 Suspension or Revocation of Appointment

15.1 A member of the Executive Committee may revoke or suspend the appointment of a deputy appointed by him or her.

15.2 The Executive Committee may suspend or remove a deputy by resolution, after giving the appointer reasonable notice of their intention to do so.

16 Form of Appointment, Suspension or Revocation

16.1 Every appointment, revocation or suspension under article 15 or Article 11 must be made by notice in writing signed by the member of the Executive Committee making it.

16.2 The notice may be given by facsimile or by similar means of communication in a reasonably legible form.

17 Termination of Appointment

17.1 The appointment of a deputy automatically ceases:

17.2 • If the member of the Executive Committee for whom the deputy acts as alternate ceases to hold office as member of the Executive Committee

17.3 • If the member represented by the Deputy ceases to be a member of the Executive Committee

17.4 • If the deputy resigns from the appointment by giving written notice left at the registered office of the Association

18 Power to Act as Deputy for More Than One Member of the Executive Committee

18.1 A member of the Executive Committee or any other person may act as deputy for and represent several members of the Executive Committee, but no more than one third or three (whichever is the lesser) of the Executive Committee.

POWERS AND DUTIES OF EXECUTIVE COMMITTEE

19 Sub-Committees and Working Groups

19.1 The Executive Committee may create and disband sub-committees and working groups, set their terms of reference and may delegate to them the authority and powers necessary to achieve their objectives. The authority and powers delegated may not exceed or contradict those permitted by Law or Charter of the Association.

19.2 The terms of reference of a sub-committee or working group should specify:

a) The name of the sub-committee or working group

b) The duties and responsibilities of the Chairman and members

c) The powers delegated to the committee or working group

d) If appropriate, the issues that must be referred to the Executive Committee, for information, approval or action

20 Duty to Prepare and Maintain a Strategy

20.1 The Executive Committee must prepare and maintain a strategy for the development of the Association and the OpenMI.

20.2 The strategy must elaborate how the aims of the Association will be achieved.

20.3 The strategy and any subsequent changes should be communicated to members of the Association within one month of their approval by the Executive Committee.

21 Borrowing Powers

21.1 If the Association borrows money from any member, the maximum rate of interest payable by the Association is 2% per annum higher than the corporate base lending rate (or nearest equivalent) quoted by the Association's bank at the date of the loan.

22 Appointment of Attorney

22.1 The Executive Committee may appoint any person or persons to be the attorney or attorneys of the Association for the purposes, with the powers, authorities and discretions (being powers, authorities and discretions vested in or exercisable by the Executive Committee), for the period and subject to the conditions they think fit.

22.2 Any power of attorney may contain those provisions for the protection and convenience of persons dealing with the attorney that the Executive Committee think fit and may also authorise the attorney to delegate all or any of the powers, authorities and discretions vested in the attorney.

PROCEEDINGS OF EXECUTIVE COMMITTEE

23 Meetings of Executive Committee

23.1 The Executive Committee may meet together for the despatching of business and adjourn and otherwise regulate their meetings as they think fit.

23.2 Meetings of the Executive Committee are closed.

23.3 The Executive Committee may invite both Association members and non-members to attend and contribute to specific meetings or parts of meetings. These invitees have no voting rights.

23.4 The minutes of any meeting of the Executive Committee must state the method of meeting and the persons present.

24 Convening of Meetings

24.1 A member of the Executive Committee may at any time request the Secretary to convene a meeting of the Executive Committee.

25   Notice of Meeting

25.1   Notice of every Executive Committee meeting must be given to each member of the Executive Committee and their deputy except that it is not necessary to give notice of a meeting of Executive Committee to any member of the Executive Committee who:

     a)   Has been given special leave of absence; or

     b)   Is absent and has not left a postal address, telephone number, facsimile number, email or other means of contact at which he or she may be given notice.

25.2   Notice of a meeting of Executive Committee may be given in writing or orally, and by postal address, telephone, facsimile, email or other means of contact.

26   Teleconference Meeting of Executive Committee

26.1   For the purpose of these articles the contemporaneous linking together in oral communication by telephone, real time audio conferencing, audio-visual or other instantaneous means ("telecommunication meeting") of a number of the Executive Committee members not less than a quorum is deemed to constitute a meeting of the Executive Committee. All the provisions of these articles relating to a meeting of the Executive Committee apply to a telecommunication meeting in so far as they are not inconsistent with the provisions of Article 28.1. The following provisions apply to a telecommunication meeting:

     a)   All the Executive Committee members for the time being entitled to receive notice of a meeting of the Executive Committee (including any deputy) are entitled to notice of a telecommunication meeting.

     b)   All the Executive Committee members participating in the meeting must be linked by telephone, real time audio conferencing, audio-visual or other instantaneous means for the purpose of the meeting.

     c)   Notice of the meeting may be given on the telephone or other electronic means.

     d)   Each of the Executive Committee members taking part in the meeting must be able to hear and be heard by each of the other Executive Committee members taking part at the commencement of the meeting and each member of the Executive Committee so taking part is deemed for the purposes of these articles to be present at the meeting.

     e)   At the commencement of the meeting each member of the Executive Committee must announce his or her presence to all the other Executive Committee members taking part in the meeting.

26.2   If the Secretary is not present at a telecommunication meeting, one of the Executive Committee members present must take minutes of the meeting.

26.3 A member of the Executive Committee may not leave a telecommunication meeting by disconnecting his or her telephone, real time audio conferencing, audio-visual or other communication equipment unless that member of the Executive Committee has previously notified the chairman of the meeting.

26.4 A member of the Executive Committee is conclusively presumed to have been present and to have formed part of a quorum at all times during a telecommunication meeting unless that member of the Executive Committee has previously obtained the express consent of the chairman to leave the meeting.

26.5 The minutes of the proceedings of a telecommunication meeting are deemed to be sufficient evidence of the proceedings and of the observance of all necessary formalities if the minutes are certified to be correct minutes by the chairman of the meeting.

27   Regional Branches and Administration

27.1 The Executive Committee may provide for the management and administration of the affairs of the Association in any specified region or locality in the manner they think fit.

27.2 The Executive Committee may:

a) Establish any regional or local committees or branches

b) Appoint any members of the Association or any nominated representative of a member to be a member of the local committee or branch

c) Appoint any managers or agents, fix their remuneration and delegate to them any of the powers vested in the Executive Committee

d) Authorise the members for the time being of the local committee or branch to fill any vacancies on it and to act despite vacancies

28   Validation of Acts of Committee

28.1 All acts done at any meeting of a Committee or of a committee of a Committee or by any person acting as a member of the Committee are, as valid as if each of them had been duly appointed and had duly continued in office and was qualified to be a member of the Committee and was entitled to vote, even if it is discovered afterwards that there was some defect in the appointment or continuance in office of any of the persons concerned or that any of them were disqualified or were not entitled to vote,.

EXECUTIVE COMMITTEE INTERESTS

29   Existence of an Interest

29.1 A member of the Executive Committee may not hold any other office or place of profit under the Association in conjunction with the office of member of the Executive Committee.

29.2 A member of the Executive Committee may to the extent permitted by the Law:

a) Enter into contracts or arrangements or have dealings with the Association either as vendor, purchaser, mortgagee or otherwise; or

b) Be interested in any contract, operation, undertaking or business entered into undertaken or assisted by the Association or in which the Association is or may be interested.

29.3 The member of the Executive Committee is not, purely because of entering into such a relationship or transaction:

a) Disqualified from the office of member of the Executive Committee; or

b) Liable to account to the Association for any profit arising from the relationship or transaction by reason of being a member of the Executive Committee of the Association or of the fiduciary relationship between the member of the Executive Committee and the Association.

29.4 For the purpose of this article "Association" includes any subsidiary of the Association and any other Association in which the Association or any subsidiary of the Association is or becomes a shareholder or is otherwise interested.

30 Disclosure of Interest

Article 13.5

30.1 It is the duty of a member of the Executive Committee of the Association who is in any way whether directly or indirectly interested in a contract or proposed contract with the Association to declare the nature of his or her interest in accordance with the provisions of the Law.

30.2 It is the duty of a member of the Executive Committee of the Association who holds any office or possesses any property whereby, whether directly or indirectly, duties or interests might be created in conflict with his or her duties or interests as member of the Executive Committee to declare the fact and the nature, character and extent of the conflict in accordance with the provisions of the Law.

INADVERTENT OMISSIONS

31 Formalities Omitted

31.1 If some formality required by these articles is inadvertently omitted or is not carried out the omission does not invalidate any resolution, act, matter or thing which but for the omission would have been valid unless it is proved to the satisfaction of the Executive Committee that the omission has directly prejudiced any member financially. The decision of the Executive Committee is final and binding on all Executive Committee members.

MINUTES

32 Minutes to be Kept

32.1 The Executive Committee must carry out the obligations imposed on the Association by the Law to cause:

a) Minutes of all proceedings of its Executive Committee to be entered, within one month after the relevant meeting is held, in books or files kept for that purpose; and

b) These minutes should be signed by the chairman of the meeting at which the proceedings took place or by the chairman of the next succeeding meeting.

32.2 The Executive Committee must cause minutes to be made of:

a) All appointments of officers and servants

b) The names of the Executive Committee members and deputies present at all meetings of Executive Committee and the Association

c) The method by which a meeting of Executive Committee was held

d) All motions proposed and seconded, including the names of all Executive Committee proposing and/or seconding the motions, and in the case of deputies, the names of the Executive Committee members they represented in the act of proposing and/or seconding

e) The outcome of all votes taken on any matters

f) On the request of any member of the Executive Committee or deputy present at the meeting, any matter so requested

33 Availability of minutes

33.1 The minutes of any meeting shall be made available for viewing at a time and place acceptable to both the requestor who must be an Association member and the person having custody of the minutes;

33.2 If no mutually acceptable time and place is decided on within three calendar months of the request, or at the discretion of the person having custody of the minutes, a copy of the requested minutes shall be provided to the requestor by post or facsimile;

33.3 If an alternative form of delivery is acceptable to both the requestor and the person having custody of the minutes, the requested minutes may be provided in that form.

NOTICES

34 Service of Notices

34.1 A notice may be given by the Association to any member by sending it to the member's contact address recorded in the Register by a means of communication decided by the Executive Committee.

INDEMNITY AND INSURANCE

35 Indemnity

35.1 To the extent permitted by the Law, the Association indemnifies:

a) Every person who is or has been an officer of the Association; and

b) Where the Executive Committee considers it appropriate to do so, any person who is or has been an officer of a related body corporate of the Association; against any liability incurred by that person in his or her capacity as an officer of the Association or of the related body corporate (as the case may be):

c) To any other person (other than the Association or a related body corporate) unless the liability arises out of conduct involving a lack of good faith; and

d) For costs and expenses:

e) In defending proceedings, whether civil or criminal, in which judgment is given in favour of the person or in which the person is acquitted; and

f) In connection with an application in relation to those proceedings, in which the Court grants relief to the person under the Law.

36   Insurance

36.1   The Association may, where the Executive Committee considers it appropriate to do so, pay or agree to pay a premium in respect of a contract insuring a person who is or has been an officer of the Association

36.2   In the case of a member of the Executive Committee, any premium paid pursuant to this article is paid in addition to remuneration paid to that member by the Association pursuant to these articles.

37   Voting on Contract of Insurance

37.1   Despite everything in these articles, a member of the Executive Committee is not precluded from voting in respect of any contract or proposed contract of insurance, merely because the contract insures or would insure the member of the Executive Committee against a liability incurred by the member of the Executive Committee as an officer of the Association or of a related body corporate.

APPENDIX 11 THE OPENMI ASSOCIATION STRATEGY

OpenMI Association Strategy

The OpenMI Association is an association ('vereniging') established under Dutch Law. Its Charter and Standing Orders are available on the Association's website. The Association is open to international membership for both organisations and individuals. According to its Charter, the objective of the Association is:

- The promotion of the development, use, management and maintenance of the Open Modelling Interface (the OpenMI), a standard for the exchange of data between computer software in environmental management

The Association seeks to achieve this goal, among other things, by:

- Exchanging information with regard to the standard specified in the objective, by word, writing and by means of electronic devices such as a website, both within the Association and with other organisations that pursue a similar objective

- Stimulating the maintenance and development of the OpenMI Standard and its supporting software and managing their release

- Stimulating the provision of information and promoting discussion on the OpenMI in Europe and across the world by the organising of and participating in events

- All that which may be further conductive to the objective

This document translates the aspirations in the Association's Charter into a vision of the role of modelling within the management of land and water, a mission statement for the Association and a strategy for achieving the mission.

1 Vision

Today's world is one where the fair and sustainable allocation of diminishing natural resources between competing demands is increasingly important to avoid conflicts. Making such decisions, however, is far from easy. Although we have considerable knowledge of individual environmental, social and economic processes in the land and water domains, our ability to predict how those processes will interact is limited; hence, it is difficult to foresee the wider implications of natural events and management policies as is required by integrated management.

It is neither feasible nor particularly useful to build a single model of all the processes in a catchment. However, emerging technologies, such as the OpenMI, are making it possible to link together new and existing models from different suppliers, based on a variety of modelling concepts and representing different domains. There is already preliminary evidence that this linked or 'integrated modelling' approach will offer an effective tool for developing and assessing integrated management options and that it leads to better decisions, i.e. decisions that make the best use of the resources.

The OpenMI Association believes that integrated management in some form or other is the only option for the future management of our resources. Because of the complexities inherent in integrated management, managers will demand ever more sophisticated decision support systems. These are essentially predictive models. As the need to understand the wider impacts of any decision increases, so the models will have to take account of more and more processes. The OpenMI Association, therefore, foresees a future where the concept of integrated modelling is widely accepted by authorities as leading to better decisions, and where it is the adopted practice in optimising the management of complex systems.

Summary:

This document translates the aspirations in the Association's Charter into:

- A vision of the role of modelling in relation to the integrated management of land and water

- A mission statement for the Association

- A strategy for achieving the mission

2 Mission

The attainment of the vision will require the combined efforts of developers, modellers and users. Within this context, the role, and hence the mission, that the OpenMI Association has set itself, is to:

- Promote integrated modelling as a means of achieving better management decisions, so that resources are more fully exploited and impacts are better understood;

- Develop and support the OpenMI Standard so that it becomes the first choice for model integration.

The OpenMI Association has defined for itself the following boundaries:

- Technical scope:

  o The exchange of data between independent models and modelling components either at run-time or when the models are run sequentially

  o Facilitating the embedding of linked models and components in decision support systems (DSSs)

- Application domain: environmental management with the priority on land and water systems.

- Intended user groups of the OpenMI and its applications: model developers, the modelling community and the competent authorities.

- Geographic focus of dissemination activities: although the OpenMI Standard can be applied world-wide, the priority regions for the OpenMI Association in the first years will be Europe and the United States of America.

3 Implementation strategy

To achieve its mission, the OpenMI Association will focus on the following key actions:

- Creating a culture that eases the adoption and acceptance of integrated modelling as a concept and the use of the OpenMI as the recognised option for integrated modelling

- Ensuring that the OpenMI remains relevant, easy to use, of high quality and available under acceptable conditions

- Supporting the community of OpenMI users and providing a compliancy service for developers who have adopted the OpenMI Standard in their products

- Disseminating necessary and useful information

- Enabling the user community to influence the development of the OpenMI and its Association

- Being the legal body that holds the ownership of the OpenMI

- Securing the necessary resources to fulfil its mission and implementation strategy

3.1   Creating a culture for integrated modelling

Changing attitudes to integrated management and modelling will require the provision of information and the creation of new skills at both high and low levels in user, modelling and developer communities.

The top-down approach will be to ensure that key decision-makers (competent authorities) are aware of the added value of integrated modelling and the role of the OpenMI Standard. Their needs will be identified so that they can be provided with the information that will enable them to make well-informed decisions about the use of integrated modelling and the OpenMI.

In parallel, the OpenMI Association will identify the most widely used model codes and decision support systems and encourage their developers to make them OpenMI compliant (if not yet so).

The bottom-up approach will be to create a new body of scientists, engineers and IT professionals with integrated modelling and OpenMI skills. This will be achieved by liaising with respected higher educational institutions and encouraging the inclusion of material on integrated modelling and the OpenMI in appropriate undergraduate, MSc and PhD courses, workshops and seminars. The Association will co-operate with the educational institutions to create course material. The development of training services by the Association's members will be similarly encouraged.

3.2   Supporting the OpenMI user community

Through its Technical Committee, the OpenMI Association will provide and supervise a forum for discussion and questions (http://sourceforge.net/projects/openmi/); this forum is intended primarily for developers. Additionally, the Association will provide and maintain a website and a 'wiki' site (wiki.openmi.org). The web site will be the entry point for the Association and the OpenMI. It will contain final copies of all key documents, news and announcements and will be designed with end users and those new to the OpenMI in mind. The site will link to the wiki, which will be the home page of the Technical Committee. The wiki will have a more informal style and will provide access to detailed technical information and reports of user experiences with the OpenMI.

The Technical Committee is not resourced to maintain a staffed help desk and cannot guarantee that all questions on the discussion forums will be answered by them. However, the Association will foster the creation of a mutually supportive OpenMI Community in the open source spirit.

The Association will always recommend end users to go first to their software supplier for support. The OpenMI Association will encourage software suppliers to build up OpenMI skills among their support staff, so that they can help their users with OpenMI-related queries. Hence, from an end user's (modeller's) point of view, the preferred channels of communication are the same as those that exist in today's single-domain modelling. All users seeking support will be welcome to explore the information available through the website and the wiki. All users, but particulalrly developers, should feel welcome to report bugs and make proposals for change to the OpenMI.

The OpenMI Association will supervise the co-ordination and organisation of training sessions for model developers to help them make their modelling software OpenMI-compliant. The Association will not provide the training itself but will collaborate with dedicated third-party trainers, who can advertise their services on the Association website. Registration for training sessions will be co-ordinated through the website. Links to published training materials and tutorials will also be provided.

End users will be asked to contact their own software providers for specific OpenMI-related training. Generic examples and general information on the functionality and use of the OpenMI User Interface, as offered by the Technical Committee, will be provided by the Technical Committee as soon as resources permit.

3.3   Dissemination of information

The main medium for disseminating information will be the OpenMI Association website (www.openmi.org), through which all formal information about the OpenMI Standard and the OpenMI Association will be made available. This website will also provide information on events, training and where to find OpenMI-compliant software.

Members will be allowed to advertise their products and services on the website. More informal information, primarily focused at developers, will be held at the OpenMI Association's wiki, which will be accessible via the website. In addition, the Association will provide a forum on Sourceforge for debate, feedback and the informal exchange of information and experience relating to the OpenMI, model integration and integrated modelling.

The OpenMI Association will convene specific sessions on the OpenMI at conferences. It will also publish papers and articles in the scientific and popular press and maintain a newsletter.

Basic material for creating OpenMI-related presentations will be made available through the website.

3.4   Availability of the technology

The Association will impose no restrictions on the use of the OpenMI for research or commercial purposes, and will not impose any royalty charges or licence fees.

The OpenMI Association will maintain, develop and release the OpenMI Standard and provide access to it through its website. The Standard will be released under the Lesser General Public Licence (LGPL) (http://ww.gnu.org/licenses/lgpl.html). The Association will provide all necessary documentation relating to the Standard.

In order to maintain the high quality and reliability of the Standard, the OpenMI Association will adopt quality assurance procedures and quality control standards. It will establish a group to monitor the driving forces, user needs and new technologies requiring further development. In this way, the OpenMI Association will seek to ensure the relevance of the OpenMI Standard. New releases will be timed to achieve a balance between the need for stability and the need to move with the times.

The OpenMI Association will ensure that there is always at least one documented Software Development Kit (SDK) and Graphical User Interface (GUI) available under suitable open-source licence conditions. It will also allow and encourage third parties to develop, deliver and maintain other versions of the SDK and GUI, or any other tools that will simplify the migration (making modelling components compliant), linking and running of integrated models.

3.5   Compliancy

The OpenMI Association will develop a procedure for establishing that components comply with a particular release, and will allow developers to label such components as 'OpenMI version *n.m* Compliant'. The Association will hold a register of OpenMI compliant components. The Association will not make any statement of warranty about OpenMI-compliant components. The Association will work towards establishing an auditing service.

4

3.6   The Association as a legal entity

The Association will be an international, non-proprietary and not-for-profit organisation.

New members will always be welcome, particularly those willing and able to contribute actively.

The OpenMI Association, as a legal entity, will ensure and safeguard the copyrights and intellectual property rights (IPR) of the OpenMI Standard and any related products created by the OpenMI Association. (The OpenMI logo and the name 'OpenMI' have been registered as a trademark and the domain names www.OpenMI.org and www.OpenMI.com have also been registered.)

3.7   Secure resources

The OpenMI Association will seek the resources to support its activities by membership fees, contributions in kind, donations, project funding or any other resource that is approved by the General Assembly.

In order to keep the required resources to a minimum, the OpenMI Association will actively encourage services to be carried out by third parties, thus creating business development opportunities for the OpenMI community.

APPENDIX 12 THE OPENMI-LIFE PROJECT PARTNERS COLLABORATION AGREEMENT

FINAL

Collaboration agreement
for

Bringing the OpenMI to LIFE

(OpenMI-LIFE)

The agreement between the partners to demonstrate the use and support of the Open Modelling Interface and Environment under the European Commission's "LIFE Environment" programme.

November 2006

Grant Agreement Number: LIFE06 ENV/UK/000409

Project Name:	Bringing the OpenMI to life
Grant Agreement No:	LIFE06 ENV/UK/000409
Version:	V1.R1.M4
Date:	22/03/2007

Bringing the OpenMI to LIFE

Collaboration agreement

Distribution List

European Commission.

The External Monitoring Team

Consortium members

Amendment History

Issue	Date	Author	Description
V1.R1.M1	03/10/2006	Roger V. Moore C. Isabella Tindall	1st Draft based upon the HarmonIT Collaboration Agreement
V1.R1.M2	10/11/2007	Roger V. Moore C. Isabella Tindall	2nd Draft following comment by the Steering Committee and Sarah Claridge of CEH Contracts Section.
V1.R1.M3	20/02/2007	Roger V. Moore C. Isabella Tindall	3rd Draft following comment by the Steering Committee on 25/01/2007.
V1.R1.M4	22/03/2007	Roger V. Moore C. Isabella Tindall	4th and final draft following comment by all project partners.

ABOUT THIS DOCUMENT

PURPOSE

The purpose of this document is to meet the requirements of Article 4.7 of the Common Provisions, which states:

> "The beneficiary shall conclude, with any partners expressively committed in the project implementation and identified in the project proposal, any agreements necessary for completion of the work, provided these in no way infringe their obligations stated in the grant agreement with the Commission. Such agreements shall clearly describe the roles, rights and responsibilities of the participants. The agreements shall describe the tasks to be performed by each participant and define the financial arrangements, taking into account the provisions of Article 20. Such agreements shall stipulate that the Community may exercise the same rights and guarantees vis-à-vis the partners as vis-à-vis the beneficiary itself. A copy of these agreements shall be notified to the Commission when finalised."

AUTHORS

Roger V. Moore C. Isabella Tindall

READERSHIP

The European Commission and project participants.

ASSUMPTIONS

The document assumes that readers are familiar with the Special and Common Provisions associated with a LIFE Grant Agreement and that readers are also familiar with the OpenMI-LIFE proposal.

CROSS-REFERENCES

Grant Agreement Number LIFE06 ENV/UK/000409, its appendices, the Common Provisions and the HarmonIT Collaboration Agreement upon which this agreement is based.

Project Name:	Bringing the OpenMI to life
Grant Agreement No:	LIFE06 ENV/UK/000409
Version:	V1.R1.M4
Date:	22/03/2007

CONTACT

For queries or further information concerning this document please contact:

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COPYRIGHT AND IPR

All methodologies, ideas and proposals in this document are the copyright of the OpenMI-LIFE project participants[1]. These methodologies, ideas and proposals may not be used to change or improve the specification of any project to which this document relates, to modify an existing project or to initiate a new project, without first obtaining written approval from those of the OpenMI-LIFE participants who own the particular methodologies, ideas and proposals involved.

TRADEMARKS

Applications have been made to the UK Patent Office to register the word 'OpenMI' and the OpenMI logo as trade marks.

ABBREVIATIONS

Aquafin	Aquafin NV
CEH	The Centre for Ecology and Hydrology, a component body of the Natural Environment Research Council
DHI	DHI - Water and Environment
EC	European Commission
FH	Flanders Hydraulic Research
HarmonIT	The acronym of the FP5 project IT Frameworks which developed the OpenMI
HRWG	The HR Wallingford Group
IT	Information Technology
NERC	Natural Enviroment Research Council
NTUA	National Technical University of Athens
OMI	Open Modelling Interface and Environment
OpenMI	The Open Modelling Interface and Environment
OpenMI-LIFE	The acronym of the LIFE Environment project called 'Bringing the OpenMI to life'
RIKZ	National Institute for Coastal and Marine Management
ULG	CEME Environmental Modelling Centre (University of Liege)
UTH	University of Thessaly

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[1] This does not include sub-contractors.

VMM-AK	Vlaamse Milieumaatschappij – afdeling Kwaliteitsbeheer (Division Quality Management)
VMM-AWA	Vlaamse Milieumaatschappij - afdeling Water (Division Water)
WL | Delft	Stichting Waterloopkundig Laboratorium
WSL	Wallingford Software Ltd

CONTENTS

The Parties to the Agreement

This COLLABORATION AGREEMENT for the LIFE Environment project "Bringing the OpenMI to life" is made in October 2006 between the following Parties:

The Natural Environment Research Council (Centre for Ecology and Hydrology), (The Beneficiary and Project Coordinator)	• United Kingdom
• DHI - Water & Environment	• Denmark
• Stichting Waterloopkundig Laboratorium (WL | Delft Hydraulics)	• Netherlands
• Wallingford Software	• United Kingdom
• The National Technical of University of Athens	• Greece
• University of Thessaly	• Greece
• Aquafin NV	• Belgium
• Vlaamse Milieumaatschappij – afdeling Kwaliteitsbeheer	• Belgium
• Flanders Hydraulic Research	• Belgium
• Vlaamse Milieumaatschappij - afdeling Water	• Belgium
• CEME Environmental Modelling Centre	• Belgium
• National Institute for Coastal and Marine Management	• Netherlands

Who will be referred to as the Principal Contractors – see Section 1 for other equivalent terms in common use by the European Commission and used in this document.

Their formal organisation names, addresses and legal contact points are given in the Grant Agreement.

1 THE COLLABORATION AGREEMENT

The Parties, who all have considerable experience in the field of modelling, have entered into a Grant Agreement with the European Commission for the Project entitled **"Bringing the OpenMI to life" Grant Agreement No. LIFE06 ENV/UK/000409/OPENMI-LIFE)** to demonstrate the use and support of the Open Modelling Interface and Environment under the European Commission's "LIFE Environment" programme.

The Grant Agreement comprises the European Commission's **special provisions, common provisions** and the following **Annexes**:

Annex I	Description of the proposal
Annex II	Bank guarantee model
Annex III	Standard statement of expenditure
Annex IV	LIFE logo
Annex V	Natura 2000 logo
Annex VI	Standard audit report

However, the Grant Agreement does not define how the project will be conducted in detail. Therefore, in line with Article 4.7 of the Common Provisions, the Parties wish to supplement the Special and Common Provisions of the Grant Agreement with this Collaboration Agreement, which will elaborate on how the project is to be conducted and the roles and responsibilities of the Parties involved. Any conflict between the Collaboration Agreement and the Special and Common Provisions of the Grant Agreement, then the Special and Common Provisions of the Grant Agreement will take precedent.

THEREFORE IT IS AGREED AS FOLLOWS:

Section 1   Definitions

1.1   Grant Agreement Definitions

Words defined in the Grant Agreement have the same meaning in this Collaboration Agreement.

1.2   Additional definitions

"Collaboration Agreement" means this agreement (including its Annexes) for the LIFE Environment Project Grant Agreement No. LIFE06 ENV/UK/000409 entitled Bringing the OpenMI to life (OPENMI-LIFE).

"Grant Agreement" means after its signature by the Commission and the Beneficiary, the Grant Agreement No. LIFE06 ENV/UK/000409 (including its Annexes) for the undertaking by the Parties of the Project.

"Defaulting Party" means a Party breaching its obligations in the way described in Section 9.7 of this Collaboration Agreement or a Party withdrawing from the Project.

"Party" or **"Parties"** means a party or the parties to this Collaboration Agreement, who are sometimes also referred to as **"project partners"**, **"project participants"**, **"contractors"** or **"principal contractors"**. Note that the definition of these terms does not cover subcontractors.

"Steering Committee" means the Steering Committee established in accordance with Section 4.

"Project Co-ordinator" means the person appointed by the Beneficiary to lead the project.

"Project Share" means for each Party, that Party's share of the total cost of the Project as shown in the Grant Agreement.

"Proposal" means the proposal for the Project submitted by the Parties to the Commission.

"Proposal" shall as applicable also mean any amendment to the Proposal which is submitted or intended to be submitted to the Commission or elsewhere.

"Software" and **"Mathematical models"** mean:

    (a)   software programs, that is sequences of instructions to carry out a process in, or convertible into a form executable by a computer and fixed in any tangible medium of expression and in any code form (including source code form);

    (b)   software information, that is technical information used, useful in or relating to the design, development, use or maintenance of any version of a software program; and/or

    (c)   software documentation, that is software information in documentary form

"Model schematization" means:

    the information required in order that a mathematical model may be used to simulate a process in a specific context.

Section 2   Purpose and Duration

2.1   Purpose

The purpose of this Collaboration Agreement is to supplement the Special and Common Provisions of the Grant Agreement in line with the Article 4.7 of the Common Provisions by elaborating on how the project is to be conducted, the roles and responsibilities of the Parties and their rights and obligations.

2.2   Duration

This Collaboration Agreement shall come into force as of the 1st October 2006. It will continue in full force and effect until terminated in accordance with Section 15 or until all obligations for the carrying out of the Project undertaken by the Parties under the Grant Agreement and under this Collaboration Agreement, whichever is the earlier, have been met.

Section 3   The Coordinator's duties and responsibilities

3.1   The Project Co-ordinator shall be responsible for providing the Chairman and Technical Secretary of the Steering Committee.

3.2   The Project Co-ordinator shall be responsible for organizing the meetings of the Steering Committee, ensuring that minutes are taken and distributed and actions followed up.

3.3   The Project Co-ordinator shall be responsible for liaison between the Parties (i.e. the project partners) and the Commission.

3.4   The Project Co-ordinator shall be responsible for organizing the preparation of all routine reports required by the Commission.

3.5   Except in his capacity as representative of the Project partners described in the Common Provisions Article 4, the Project Co-ordinator shall not act or make legally binding declarations on behalf of any other Party and has no authority to do so unless specifically requested by the Parties in writing.

Section 4   Steering Committee

4.1   The project shall be directed by a Steering Committee under the Chairmanship of the Project Co-ordinator.

4.2   The Steering Committee's membership will be composed to reflect the interests represented in the project as follows (See also Articles 4.8, 4.9 and 4.10):

- Project Management
  - The Project Co-ordinator
  - The Project Manager
- The Competent Authorities and the Modelling Community
  - Three members
- The Developers
  - Three members

4.3   The Steering Committee's main objective shall be to ensure the project is delivered on time and to budget.

4.4   The Steering Committee shall be a working committee with specific responsibilities allocated to specific members. Its terms of reference shall be to:

(a)   Set priorities and allocate resources

(b)   Monitor progress and resolve problems

(c)   Ensure the products are of appropriate quality

(d)   Organise the dissemination of the project's results in conformance with Articles 16 and 17 of the Common Provisions

(e)   Agree the dissemination of the project results which are not to be used by the Parties but without prejudice to Section 13

(f)   Organise the exploitation of the project's results and the project's continuation after the end of the Grant Agreement in conformance with Article 17 of the Common Provisions

(g)   Liaise with other relevant projects, particularly those identified by the European Commission

(h)   Serve notices on defaulting Parties in accordance with Section 9.7 and distribute the tasks of the defaulting Parties among the remaining Parties

(i)   Manage project finances

(j)   Report to the EC through the Project Coordinator in conformance with Article 11 of the Common Provisions

4.5   The members of the Steering Committee who will have voting rights are:

- The Project Co-ordinator
- The representatives of the Competent Authorities and the Modelling Community
- The representatives of the Developers

In the event of a tied vote, the Project Co-ordinator will decide the issue.

4.6   Each member shall have a deputy. A deputy may only vote if the person for whom he or she is deputising is absent.

4.7 Members shall be expected to attend Steering Committee meetings and should only send a deputy in exceptional circumstances. Continuity in representation is regarded as important.

4.8 The Steering Committee may co-opt additional non-voting members and invite experts to its meetings as appropriate.

4.9 Particular roles which either may be assigned to individuals or for which additional members may be co-opted shall be:

- Project Manager

- The Technical Secretary

4.10 Any Task leaders who are not members of the Steering Committee will normally be invited to attend Steering Committee meetings as non-voting members.

4.11 Should it be necessary to replace a member, the member's parent organisation must inform the Steering Committee in writing and provide a new member of equivalent ability and standing.

4.12 The Steering Committee shall meet 3 or 4 times a year or when necessary and its meetings shall be minuted. Whenever possible its meetings should be held at the same time as a workshop or other event when most members are already together.

4.13 Normally, meetings shall be called by the Chairman but may be called by any member.

4.14 At least, fifteen days notice should be given of the intention to hold a Steering Committee meeting. The agenda must accompany the notice of the meeting. Meetings may be held at shorter notice if all the members agree.

4.15 The minutes shall be circulated to the Steering Committee members as soon as possible after the meeting. If no objections or corrections have been received within 15 days, they shall be deemed to be a correct record of the meeting.

4.16 If it is necessary to resolve a decision by voting, each member shall have one vote. A quorum shall be 5 members. All decisions shall be by majority vote. If a member or his deputy cannot attend, a proxy may be appointed. A proxy should only be used in the most exceptional circumstances.

4.17 Any decision requiring a vote must be identified on the Agenda unless all members or their proxies are present at the meeting.

Section 5   Responsibilities of Task leaders

5.1   Each Party that is responsible for leading one or more Tasks shall appoint a Task leader.

5.2   The Task leader shall be responsible for managing the tasks and delivering the Task outputs.

5.3   Task leaders shall report, at intervals to be decided by the Steering Committee, in writing to the Steering Committee and the Project Manager.

5.4   Task leaders shall be responsible for checking the reasonableness of man-power inputs reported by the Parties working on their Tasks.

Section 6   Responsibilities of each Party

6.1   Towards the Coordinator and the Steering Committee

Each Party shall use all reasonable endeavours to supply promptly to the Coordinator all such information or documents as the Coordinator and the Steering Committee need to fulfil obligations arising from this Collaboration Agreement and the Grant Agreement

6.2   Towards each other

(a)   Each Party shall use its best endeavours to fulfil, promptly and on time, all of its obligations to each other Party under the Grant Agreement and this Collaboration Agreement. This includes the submission to the Project Co-ordinator of all requested progress reports and financial information.

(b)   Each Party shall use all reasonable endeavours to:

(i)   notify each of the Parties promptly of any significant delay in performance;

(ii)   inform other Parties of relevant communications it receives from third parties in relation to the Project.

(c)   Each Party shall use all reasonable endeavours to ensure the accuracy of any information or materials it supplies under the Grant Agreement and this Collaboration Agreement and promptly to correct any error therein of which it is notified or becomes aware. The recipient Party shall be entirely responsible for the use to which it puts such information and materials.

(d) Where a Party reasonably needs access to another Party's or a third party's knowledge or pre-existing know-how in order to meet its obligations then the other Party shall use all reasonable endeavours, having due regard to its own commercial interests, to provide access to that knowledge or pre-existing know-how solely for the purpose of completing the project. Such access shall not override any property or continuing user rights in the knowledge or pre-existing know-how involved.

(f) Each Party must keep its costs within the budget for each Task. Overspends on one Task cannot be recovered from another Task unless the Party has the prior permission of the Steering Committee.

Section 7 Costs

7.1 Payments

7.2 On receipt of funding from the Commission, the Coordinator undertakes to transfer to the relevant Parties appropriate sums without unreasonable delay. The Coordinator shall notify each Party of the date and amount transferred to its respective bank account and shall give the relevant references.

7.3 Each Party shall be responsible for providing its share of the co-funding described in Form F1 of the proposal.

7.4 Any costs arising from transferring the appropriate sums to each Principal Contractor or from raising the co-funding shall be covered by the receiving Parties.

7.5 All money transfers shall be made in the currency of the European Union (EURO)

7.6 Any participant who becomes responsible for transferring funds to another partner should use an efficient and cost effective method to effect the transfer, for example,by the use of IBAN and BIC/Swift coding, to keep bank costs to a minimum.

7.7 Travel and subsistence

7.8 The Parties are responsible for administering the funds allocated to them.

7.9 The Parties must account for the funds to the project manager and provide him/her with information as required by the EC reporting guidelines.

7.10 The funds may only be used in connection with achieving the objectives of OpenMI-LIFE. Any other use of the funds must have the prior approval of the Steering Committee or, in the case of minor costs, the co-ordinator.

7.11 The Parties intending to charge travel and subsistence costs to OpenMI-LIFE for attending Task meetings must have the prior approval of the Task leader before incurring costs.

7.12 The Task leaders should check that the travel and subsistence costs claimed against their Tasks are reasonable.

7.13 The Parties may not exceed their allocation.

7.14 It is the duty of Task leaders to ensure that travel and subsistence costs are kept to a minimum compatible with achieving their objectives. They must collaborate with their fellow leaders to minimise the number of meetings and journeys. Individuals also have a duty to keep their costs to a reasonable minimum.

7.15 The staff of OpenMI-LIFE participants attending OpenMI-LIFE meetings and events should recover their travel and subsistence expenses through the normal procedures of their own organisation.

7.16 Subject to the approval of the Steering Committee and funds being available, Task leaders may invite experts and others to OpenMI-LIFE meetings. For these guests, the travel and subsistence expenses for which receipts are produced will be reimbursed by the Task leader.

Section 8   Confidentiality

8.1 Any Party who receives from another Party "Confidential Information", shall not without the prior written approval of this other Party, disclose this Confidential Information neither to any third party nor to any other Parties to this Collaboration Agreement. For the purpose of this Agreement, "Confidential Information" shall mean any information that is disclosed by the disclosing Party to the receiving Party/Parties for the purposes of the furtherance of the Grant Agreement and this Collaboration Agreement, that:

(a) is marked at the time of disclosure as being "Confidential" or "Proprietary" or words of similar import;

(b) is disclosed orally or visually and is designated "Confidential", concurrent with the oral or visual disclosure;

(c) is known or could be known by any reasonable person to be of a confidential nature;

(d) includes or consists of software in source code form;

(e) gives any qualification of the quality of the software of a Party.

8.2 The provisions of Clause 8.1 above shall not apply to any information which

(a) at the time of disclosure to the Party, was generally available to the public, or

(b) after the time of its disclosure to the Party, becomes publicly available otherwise than through any act or omission on the part of the receiving Party, or

(c) at the time of disclosure to the Party, already in the possession of the receiving Party, without any restrictions on disclosure, or

(d) had already been rightfully acquired from others without any undertaking of confidentiality, or

(e) was developed independently of the work under the Grant Agreement by the receiving Party.

8.3 Nothing in 8.1 shall prevent the communication of information which is rightfully possessed:

(a) in order to comply with the law or with a court order provided that insofar as reasonably possible the complying Party shall have informed the owner of the information of such need and shall have complied with the owner's reasonable instructions for the protecting the confidentiality of the information;

(b) to any other third party insofar as this is necessary to carry out the Grant Agreement and/or this Collaboration Agreement.

8.4 Where a Party receiving confidential information needs and has permission to pass that information to a third party in order to carry out the Grant Agreement and/or this Collaboration Agreement, the Party shall use all reasonable endeavours to ensure the third party is aware of the confidential nature of the information and uses all reasonable endeavours to ensure that it is only used for the purposes of the Grant Agreement and or this Collaboration Agreement.

Section 9   Liabilities

9.1   Liability towards each other

In respect of information or materials supplied by one Party to another hereunder or under the Grant Agreement, the supplier Party shall be under no obligation or liability other than as stated in Section 6 and no warranty condition or representation of any kind is made, given or to be implied as to:

(a)   the sufficiency, accuracy or fitness for purpose of such information or materials,

(b)   the absence of any infringement of any proprietary rights of third parties by the use of such information and materials

The recipient Party shall in any case be entirely responsible for the use to which it puts such information and materials.

9.2   Indemnification of each other

Each Party shall indemnify each of the other Parties, within the limits set out in Sections 9.3 and 9.7, in respect of liability resulting from acts or omissions of itself, its employees or its agents provided always that such indemnity shall not extend to claims for indirect or consequential loss or damages such as but not limited to loss of profit, revenue, contracts or the like.

9.3   Claims of the Commission

If the Commission, in accordance with the common provisions of the Grant Agreement, claims any reimbursement, indemnity or payment of damages from one or more Parties:

(a)   each Party whose default has caused or contributed to the claim being made shall indemnify each of the other Parties against such claims provided always that the total limit of liability of that Party to all of the other Parties collectively in respect of any and all such claims shall not exceed the Party's Eligible Costs according to the Financial Forms in Annex I of the Grant Agreement - any excess shall be apportioned between all the Parties pro rata to their Project Shares; and

(b)   in the event that it is not possible to attribute fault to any Party under (a) above, the amount claimed by the Commission shall be apportioned between all the Parties pro rata to their Project Shares.

9.4   Liability towards Third Parties

Subject always to such other undertakings and warranties as are provided for in this Consortium Agreement and the Grant Agreement, each Party shall be solely liable for any loss, damage or injury to third parties resulting from its carrying out its parts of the Project and from its use of knowledge or pre-existing know-how.

9.5   Subcontractors

(a) Each Party shall be fully responsible for the performance of any part of its share of the Project or other Grant Agreement obligation, in respect of which it enters into any contract with a third party (e.g. a Subcontractor) and shall ensure:

    (i) such contracts enable fulfilment of the Grant Agreement;

    (ii) the other Parties' Access Rights are the same as would have been the case had the contracting Party performed its share of the Project and/or those obligations itself; and

    (iii) the third party shall not have access to any other Party's knowledge or pre-existing know-how without that Party's prior written consent.

(b) Each Party shall inform the other Parties and give the reasons in writing if it intends to enter into a contract referred to in Section 9.5 (a), if such an event has not been detailed in the Grant Agreement Annex I and the contract is other than for a minor or trivial part of its share of the Project. Such Party shall consider in good faith comments made, pursuant to the Common Provisions Article 5, in relation to such contract.

(c) In addition to the obligations pursuant to the Common Provisions Article 5.7, each Party shall ensure that it can grant Access Rights to the knowledge or know-how they create after the Project Commencement Date and that it can fulfil its obligations under the Grant Agreement notwithstanding any rights of its employees, or persons it engages to perform part of its share of the Project.

9.6   Defaults and Remedies (1)

Subject to the aggregate limit on its liability under 9.3(a), a Party in default of its obligations under the Grant Agreement whose default causes lawful withholding of payments by the Commission to other Parties, shall pay to the other Parties interest on the amount withheld at an annual rate equal to one (1) percentage point above the prime rate of interest on overdrafts charged according to Euro Interbank (EURIBOR) on the last working day before the Commission informed the other Parties of such withholding or on the last working day before which the Parties or the Coordinator became aware of such withholding (whichever was the earlier). Such interest shall accrue on a daily basis until the Commission has effectively transferred the withheld amount to the Coordinator.

9.7   Defaults and Remedies (2)

In the event of:

(a)   a substantial breach, but not in case of force majeure, by a Party of its obligations under this Collaboration Agreement or the Grant Agreement which is irremediable or which is not remedied within one month of written notice from the other Parties requiring that it be remedied, or

(b)   Section 15.3 applying, or

(c)   the Commission terminating the Grant Agreement in respect of a Party,

the other Parties may jointly terminate this Collaboration Agreement with respect to the Defaulting Party concerned by not less than one month's prior written notice.

Such termination shall take place with respect to such Defaulting Party as of the date of such notice, subject to the provisions in (i) to (ii) below.

Notice of such termination pursuant to (a) or (b) above shall be given to the Commission and the Commission shall be requested to terminate the Grant Agreement with respect to the Defaulting Party pursuant to the Common Provisions Article 13 or to state it does not object to the withdrawal from the Project of the Defaulting Party in accordance with the Common Provisions Articles 13, provided always that:

(i)   the Access Rights granted to the Defaulting Party pursuant to this Collaboration Agreement shall cease immediately;

(ii)   the Access Rights granted and the obligations to grant Access Rights pursuant to this Consortium Agreement or the Grant Agreement by the Defaulting Party shall remain in full force and effect;

(iii)   the Defaulting Party shall:

a)   be responsible for and pay all reasonable direct cost increases (if any) resulting from the assignment referred to in Section 4.4(h) in comparison with the costs of the tasks of the Defaulting Party as specified in the Grant Agreement Annex I at the date of termination of this Collaboration Agreement with respect to the Defaulting Party; and

b) be liable for any so resulting additional direct costs incurred by the other Parties, up to a total amount which taken together with any liability to the Commission under Section 9.3, liability to the other Parties for interest under Section 9.6 and liability under Section 9.7(iii)a) above shall not exceed the total maximum limit of liability specified in Section 9.3 in respect of the Defaulting Party and any excess amount shall be shared between the Parties (including the Defaulting Party) pro rata to their Project Shares at the date of termination of this Collaboration Agreement with respect to the Defaulting Party.

The Defaulting Party shall be deemed to have agreed as the case may be to the termination pursuant to the Common Provisions Article 7(3)(b) or its withdrawal from the Project pursuant to the Common Provisions Article 7(2)(b) with the proviso that such deemed agreement shall be without prejudice to the rights of the Defaulting Party to appeal against such termination or withdrawal as the case may be.

Section 10   Force Majeure

10.1   A failure in the performance of this Collaboration Agreement cannot be imputed or assumed to a Party to the extent it is due to Force Majeure. The expression "Force Majeure" shall mean any unforeseeable and insuperable event affecting the Party fulfilling its obligations hereunder.

10.2   Each Party shall notify the other Parties in writing of any Force Majeure as soon as possible. The Parties shall discuss in good faith the possibilities of a transfer of tasks affected by the event. Such discussions shall commence as soon as reasonably possible. If such Force Majeure event is not overcome within 6 weeks after such notification, the transfer of tasks shall be carried out.

Section 11   Intellectual property rights and Property

11.1   Pre-existing Intellectual Property Rights

The Intellectual Property Rights provided by a Party for use in the project (pre-existing intellectual property) shall remain with and be owned by the providing Party.

Any enhancements or alterations to pre-existing intellectual property under this project shall become, at the conclusion of the project, the intellectual property of the Party providing the pre-existing intellectual property.

The Party that changes or alters the pre-existing intellectual property as meant in the foregoing paragraph ("changing Party"), transfers hereby for the future all the rights stipulated in the foregoing paragraph to the Party who owns the pre-existing Intellectual Property Right. In case any further deed is to be executed or any further formality is to be followed to complete this transfer, the changing Party is obligated to provide its unconditional co-operation. The changing Party shall not oppose any future amendment and/or expansions of the rights thus transferred.

11.2   New Intellectual Property Rights

The Intellectual Property Rights resulting from this project, excluded those meant under 11.1, shall remain with and be owned by the Party creating this intellectual property.

11.3   Property

Unless explicitly provided for in this Agreement or agreed upon separately in writing, nothing in this Agreement shall be construed to transfer any property rights.

Annex I defines how the ownership of the project's deliverables will be distributed among the Parties.

Section 12   Access

12.1   General principles relating to Access Rights

All Access Rights for carrying out the Project and for use are granted on a non-exclusive basis.

No transfer costs shall be charged for the granting of Access Rights unless these have been provided for in the proposal.

12.2   Access Rights for carrying out the Project

(a) Access Rights to the software, mathematical models, model schematizations, knowledge, pre-existing know-how or other property of a partner which are related to the partners activities within the Project and which are needed for carrying out the project shall be deemed granted, as of the date set out in the Grant Agreement Article 2, on a royalty-free basis to and by all Parties.

(b) For the avoidance of doubt and for the protection of ownership and intellectual property rights relating to software, mathematical models, model schematizations, knowledge, pre-existing know-how or other property, software, mathematical models, model schematizations, knowledge, pre-existing know-how or other property shall be made available among the OpenMI-LIFE Parties only insofar as and in a form which is suitable for carrying out the Project. Notwithstanding the foregoing, the supplying Party shall have no obligation to port the software to any particular equipment or to change it from the form in which the supplying Party has it.

(c) Each Party agrees not to use knowingly, as part of a deliverable or in the design of a deliverable, any proprietary rights (whether comprising intellectual property rights or proprietary information or otherwise) of a third party for which such Party has not acquired the right to grant licenses and Access Rights to the other Parties.

12.3 Access to Results of the Project

All Parties are allowed to exploit the results of the Project whose ownership is assigned to them in Annex I freely and without restrictions. Such exploitation may start during the project, subject to the limitation that no Party may violate the confidentiality rules set forth in this Agreement.

The right to exploit Project results that are to be jointly owned by all the partners is non-exclusive, meaning that no Party or group of Parties may seek to obtain exclusive rights to any such Project results. The Parties may use these Project results in the development of products or services, which are copyrighted or patented, but only to the extent that such patents or copyrights shall not prevent other Parties from making use of the same original Project results.

12.4 Liability to Project results

During and after the Project, OpenMI-LIFE Parties are safeguarded against and absolved from any liability claims associated with any Project results but, in particular, from any liability claims arising from bugs in software developed in this project.

Section 13   Publications, Press Releases and Reports to the Commission

13.1   Without prejudice to any obligation of confidentiality in respect of another Party's information, publications relating to Common Provisions Article 9(3) shall accord with the following:

(a)   When the Parties have agreed that a Project Deliverable is to be available to the public, any Party may publish information from or about the Project Deliverable without reference to any other Party.

The publication must contain clear acknowledgements of the role of the OpenMI-LIFE project and the LIFE Environment Programme in creating the deliverable as required by the Common Provisions.

(b)   In respect of other publications, a copy of the planned publication shall be supplied together with a prior warning. Any objection to the planned publication shall be made in accordance with the Grant Agreement in writing to the Coordinator and to any Party concerned. If no such objection is made within a time limit of 30 days after the issue of the warning, then publication may proceed. When there is an objection, the involved Parties shall discuss how the objection can be overcome. The opposing Party shall not unreasonably continue to object if the appropriate actions are performed following the discussion.

Justifiable grounds for objection are:

(i)   business reasons concerning the inclusion of the opposing Party's knowledge or pre-existing know-how.

(ii)   the protection of knowledge or pre-existing know-how where the publication of the material identified in objection would adversely affect such protection.

In the case of (ii) above the objecting Party shall use all reasonable endeavours to overcome such barrier to publication as quickly as possible. The publishing Party shall postpone the publication of such material until such barrier has been overcome.

13.2   In addition to the requirements of Common Provisions Article 18, all documents, regardless of the media by which they are transmitted or presented shall:

(a)   mention the project title and acronym.

(b)   be clearly marked confidential if they contain confidential information.

13.3   If a confidential document is supplied to the Commission, it must be clearly labelled, 'This document is confidential and may only be used only for information purposes by Community Institutions to whom the Commission has supplied it'.

13.4   All publications of whatever type and through whatever medium shall contain suitable qualifications as to the degree of reliance to be placed upon particular conclusions. They must contain suitably worded Disclaimers designed to deliver the intent of Section 12.4 above.

Section 14   Assignment

No Party shall, without the prior written consent of the other Parties, assign or otherwise transfer partially or totally any of its rights and obligations under this Collaboration Agreement.

Section 15   Termination

15.1   After signature of the Grant Agreement, no Party shall be entitled to withdraw from this Collaboration Agreement and/or participation in the Project unless:

(a)   that Party has obtained the prior written consent of the other Contractors (such consent not to be unreasonably withheld), and the Commission, to the withdrawal from, or termination of, the Grant Agreement; or

(b)   that Party's participation in the Grant Agreement is terminated by the Commission pursuant to the provisions of the Common Provisions Article 7; or

(c)   the Grant Agreement is terminated by the Commission for any reason whatsoever, provided always that a Party shall not by withdrawal or termination be relieved from:

(i)   its responsibilities under this Collaboration Agreement or the Grant Agreement in respect of that part of that Party's work on the Project which has been carried out (or which should have been carried out) up to the date of withdrawal or termination; or

(ii)   any of its obligations or liabilities arising out of such withdrawal or termination.

15.2   If any Party's participation in the Grant Agreement is terminated by the Commission pursuant to the provisions of the Common Provisions, Article 7, or a Party withdraws from the Project, then, without prejudice to any other rights of the other Parties the provisions of Sections 4.4(h), 9.6 and 9.7(a) and shall apply.

15.3   If any Party enters into bankruptcy or liquidation or any other arrangement for the benefit of its creditors the other Parties shall, subject to approval by the Commission, be entitled to take over the fulfilment of such Party's obligations and to receive subsequent payments under the Grant Agreement in respect thereof.

In such event all rights and obligations under the Grant Agreement and this Collaboration Agreement shall in good faith be redistributed among the remaining Parties and the affected Party on the basis of the work performed by the affected Party prior to the occurrence of the above circumstance.

The provisions of Section 1, Section 6.2(d), Section 8, Section 9, Section 11, Section 15and Section 16 shall survive the expiration or termination of this Collaboration Agreement to the extent needed to enable the Parties to pursue the remedies and benefits provided for in those Sections.

15.4   Termination of the Collaboration Agreement and/or cessation of licences granted to the Defaulting Party in accordance with Section 9.7(c)(i) and 9.7(c)(ii) shall not terminate any sublicenses granted or agreed to be granted or offered by the Defaulting Party prior to the date on which such termination of the Consortium Agreement and/or cessation of licences becomes effective, provided that the Party or Parties which generated the knowledge or pre-existing know-how so sublicensed shall have the right to have an assignment of the Defaulting Party's rights under such sub-licences.

15.5   For the avoidance of doubt, termination or withdrawal shall not affect any rights or obligations incurred prior to the date of the termination.

Section 16   Settlement of Disputes

16.1   Where a problem cannot be resolved at the level at which it arises, the Parties involved shall report it to the next level up within three days or sooner if appropriate. Problems that the Project Manager cannot resolve shall be reported to the Project Co-ordinator who will liaise with the Steering Committee. A special meeting of the committee shall be called if required.

16.2   All disputes or differences arising in connection with this Collaboration Agreement which cannot be settled amicably shall be finally settled by arbitration in Paris under the rules of arbitration of the International Chamber of Commerce by one or more arbitrators to be appointed under the terms of those rules. In any arbitration in which there are three arbitrators, the chairman shall be of juridical education.

16.3   The award of the arbitration shall be final and binding upon the Parties concerned.

16.4   Alternatively, the Parties may elect to resolve by mediation a dispute or difference arising in connection with this Collaboration Agreement which cannot be settled amicably.

Section 17   Language

All meetings, documents and other forms of communication relating to the project shall be in English.

Section 18   Notices

18.1   Any notice to be given under this Collaboration Agreement shall be in writing to the appropriate address and recipient specified in the Grant Agreement or to such other address and recipient as a Party may designate in respect of that Party by written notice to the others.

18.2   It shall be deemed to have been served when personally delivered, or, if transmitted by fax, electronic or digital transmission when transmitted provided that such transmission is confirmed by receipt of a successful transmission report.

Section 19   Applicable Law

19.1   This Collaboration Agreement shall be construed according to and governed by the law provided in the Grant Agreement Article 5.

Section 20   Entire Agreement - Amendments

20.1   This Collaboration Agreement, the Grant Agreement and - when such exist(s) - Complementary Contract(s), constitute the entire agreement between the Parties in respect of the Project, and supersede all previous negotiations, commitments and writings concerning the Project including any memorandum of understanding between the Parties (whether or not with others) which relate to the Project or its proposal to the Commission.

20.2   Amendments or changes to this Collaboration Agreement shall be valid only if made in writing and signed by an authorised signatory of each of the Parties.

Section 21   No partnership or agency

21.1   Nothing in this Collaboration Agreement shall create a partnership or agency between the Parties.

Section 22   Signatures

AS WITNESS the Parties have caused this Collaboration Agreement to be duly signed by the undersigned authorised representatives:

PARTNER 1:

Authorised to sign on behalf of

The Natural Environment Research Council (NERC/CEH) ("the co-ordinator"), North Star Avenue, Polaris House, SN2 1EU SWINDON – United Kingdom.

Name: Mr. Brian Butler, Head of Administration

Signature:

(stamp of the organisation)

Date:

PARTNER 2:

Authorised to sign on behalf of

DHI – Institute of Water & Environment (DHI), Agern Alle 5, DK 2970 HOERSHOLM – Denmark.

Name: Asger Kej, Managing Director.

Signature:

(stamp of the organisation)

Date:

PARTNER 3:

Authorised to sign on behalf of

Stichting Waterloopkundig Laboratorium (WL|Delft), Rotterdamseweg 185, PO Box 177, 2600 MH DELFT – Netherlands.

Name: J. P. P. Groen, Director

Signature:

(stamp of the organisation)

Date:

PARTNER 4:

Authorised to sign on behalf of

Wallingford Software Ltd (WSL), Howberry Park, OX10 8BA WALLINGFORD – United Kingdom

Name: S. Tunstall, Managing Director

Signature:

(stamp of the organisation)

Date:

PARTNER 5:

Authorised to sign on behalf of

Ethnikon Metsovion Polytechnion Athinon (National Technical University of Athens (NTUA)), Heroon Polytechniou 9 15780 ZOGRAPHOU – Greece.

Name: Prof. Yannis Polyzos, Vice Rector

Signature:

(stamp of the organisation)

Date:

PARTNER 6:

Authorised to sign on behalf of

University of Thessaly (UTH), Pedion Ateos, 38334 VELOS, Greece.

Name: George Liberopoulos, Vice Chairman of the Research Committee of the University of Thessaly.

Signature:

(stamp of the organisation)

Date:

PARTNER 7:

Authorised to sign on behalf of

Aquafin (Aquafin), Dijkstraat, 2630 AARTSELAAR – Belgium.

Name: Luc Bossyns, Managing Director.

Signature:

(stamp of the organisation)

Date:

PARTNER 8:

Authorised to sign on behalf of

Vlaamse Milieumaatschappij – afdeling Kwaliteitsbeheer (VMM-AK), A. Van de Maelestraat 96, 9320 EREMBODEGEM – Belgium.

Name: Mr. Frank Van Sevencoten, Administrator-General.

Signature:

(stamp of the organisation)

Date:

PARTNER 9:

Authorised to sign on behalf of

Flanders Hydraulic Research (FH), Berchemlei 115, 2140 BORGERHOUT – Belgium.

Name: Freddy Wens, Chairman - Director.

Signature:

(stamp of the organisation)

Date:

PARTNER 10:

Authorised to sign on behalf of

Vlaamse Milieumaatschappij - afdeling Water (VMM-AWA), K. Albert-II laan 20 bus 16, 1000 BRUSSELS - Belgium

Name: Frank Van Sevencoten, Administrator-General.

Signature:

(stamp of the organisation)

Date:

PARTNER 11:

Authorised to sign on behalf of

Université de Liège (ULG), Place du XX Août, 7, 4000 LIEGE – Belgium.

Name: Bernard Rentier, Rector of the University of Liege.

Signature:

(stamp of the organisation)

Date:

PARTNER 12:

Authorised to sign on behalf of

National Institute for Coastal and Marine Management (RIKZ), Kortenaarkade 1, 2500 EX THE HAGUE – Netherlands.

Name: ...., ManagingDirector.

Signature:

(stamp of the organisation)

Date:

ANNEX I THE OWNERSHIP OF PROJECT DELIVERABLES

This Annex defines for each deliverable the organisation, Party or Parties that will take ownership of it on completion or termination of the OpenMI-LIFE project. The deliverables are grouped according to the task that will produce them.

Task ID	A	Task Title	Build capacity	
Deliverable Description				**Ownership at the end of the project**
Training material				OpenMI Association
Training course 1 on OpenMI concepts for end users (Greece)				N/A
Training course 1 on OpenMI concepts for end users (Belgium)				N/A
Training course 2 on OpenMI concepts for end users (Greece)				N/A
Training course 2 on OpenMI concepts for end users (Belgium)				N/A
Training course 1 on OpenMI upgrades for developers (Greece)				N/A
Training course 1 on OpenMI upgrades for developers (Belgium)				N/A
Training course 2 on OpenMI upgrades for developers (Greece)				N/A
Training course 2 on OpenMI upgrades for developers (Belgium)				N/A

Task ID	B	Task Title	Demonstrate the OpenMI in the Scheldt	
Deliverable Description				**Ownership**
Defined Use Cases				All Parties jointly and equally.
Software, mathematical models and model schematisations migrated or adapted to use the OpenMI Interface				The original supplier will take ownership of any modifications.
Evaluation report from user and developer perspectives on integrated modelling using the OpenMI for water management issues				All Parties jointly and equally.
Evaluation report on the OpenMI from a user perspective				All Parties jointly and equally.
Evaluation report on the OpenMI support organisation from user perspective				All Parties jointly and equally.

Task ID	C	Task Title	**Demonstrate the OpenMI in the Pinios**
Deliverable Description			**Ownership**
Defined Use Cases			All Parties jointly and equally.
Software, mathematical models and model schematisations migrated or adapted to use the OpenMI Interface			The original supplier will take ownership of any modifications.
Evaluation report from user and developer perspectives on integrated modelling using the OpenMI for water management issues			All Parties jointly and equally.
Evaluation report on the OpenMI from a user perspective			All Parties jointly and equally.
Evaluation report on the OpenMI support organisation from user perspective			All Parties jointly and equally.

Task ID	D	Task Title	**Demonstrate the OpenMI technical support, maintenance and co-ordination**
Deliverable Description			**Ownership**
Management protocol report			OpenMI Association
6-Monthly software releases of OpenMI upgrades			OpenMI Association
6-Monthly document addenda			OpenMI Association
Final documentation release of the updated OpenMI			OpenMI Association
Evaluation report from OpenMI coordination perspective			OpenMI Association
Maintained OpenMI website			OpenMI Association
Business plan (Including After LIFE Communication report)			OpenMI Association

Task ID	E	Task Title	Disseminate information	
Deliverable Description				Ownership
Best practice manual				OpenMI Association
Papers and Journals (6), e.g. Journal of HydroInformatics.				OpenMI Association
Press articles (8)				OpenMI Association
Conference presentations (6), e.g. HydroInformatics and iEMSs				OpenMI Association
OpenMI-Life web site (multi-lingual)				OpenMI Association
Workshops(5)				N/A
Associate with existing newsletters (3),e.g. Rivers List, IAHS, etc.				OpenMI Association
Leaflets (4, multi-lingual)				OpenMI Association
Posters (4)				OpenMI Association
Layman's report				OpenMI Association

Task ID	F	Task Title	Manage OpenMI-LIFE	
Deliverable Description				Ownership
The Collaboration Agreement				All Parties jointly and equally.
1st Progress Report to EC				All Parties jointly and equally.
2nd Progress Report to EC				All Parties jointly and equally.
3rd Progress Report to EC '(Mid-term Report')				All Parties jointly and equally.
4th Progress Report to EC				All Parties jointly and equally.
5th Progress Report to EC				All Parties jointly and equally.
6th Progress Report to EC '(Final Report')				All Parties jointly and equally.
Miscellaneous reports required by the EC				All Parties jointly and equally.

Lowland Catchment Research Programme (LOCAR)

Data Centre meeting

Date: 23rd May 2008 at 09.30 coffee in meeting room.
Venue: Kennet room (09:00 – 12:00) CEH Wallingford

Participants: Roger Moore   CEH Wallingford (Water)
Hazel Murphy   CEH Wallingford (Water)
Ahamed Zayaan   CEH Wallingford (Water)
Helen Keeble   CEH Wallingford (Water)
Ned Hewitt   CEH Wallingford (CST)

Objectives:

- To discuss the current situation of the Data Centre activities

Agenda

1. Introduction:

- Purpose of the meeting.
- Ahamed Zayaan leaving CEH 13th June

2. Outstanding Data Centre's work

- Issues with outstanding and on coming data requests.
- Issues on data that needs to be delivered to the Data Centre.

3. Progress of the data downloading web site (demo)

4. Outstanding data to be loaded to WIS

- Data stored in the M: drive
- Data stored in the WISKI
- Data stored in Hydrolog (CHASM)
- Data still need to be collected from CST's
- Data stored in other databases

5. Review of the training and handover process

6. Conclusion

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APPENDIX 13 EXAMPLES OF DISSEMINATION MATERIAL DEVELOPED

Please find attached a selection of the dissemination material that has been developed as part of the project. Firstly a copy of the first OpenMI Association newsletter, then the new OpenMI Association poster and lastly, the OpenMI Standard poster.

OpenMI Association Newsletter #1 - January 15th 2008
Having trouble viewing this email? View the hosted version

The OpenMI Association Newsletter

The OpenMI Association is the organisation responsible for the development, maintenance, and promotion of the Open Modelling Interface (OpenMI). OpenMI is a standard, which facilitates the linking of simulation models and model components of environmental and socio-economic processes. It thus enables managers to more fully understand and predict the likely impacts of their policies and programmes.

Visit the OpenMI Association web site at http://www.openmi.org/ to learn which models are already OpenMI compliant, get help on OpenMI model migration, request new features, exchange opinions and provide feedback related to OpenMI implementations.

News

▶ Versions 1.4.Net (org.OpenMI.Standard, SDK and GUI) and 1.4 Java (org.OpenMI.Standard) were released in December 2007. They can be downloaded from http://www.openmi.org/.

▶ The OpenMI Association Membership Application form has become available on the OpenMI website.

▶ A new OpenMI Association website supporting the needs of the OpenMI community will be available by the end of January 2008 from the same web address (http://www.openmi.org/).

Future Events

▶ **OpenMI Association Dissemination Committee Meeting**
January 9, 2008
Aartselaar, Belgium

▶ **OpenMI Association Technical Committee Meeting**
February 4-6, 2008

OpenMI supports integrated flood risk modeling in Havant, UK

In 2005, Atkins, a major inte commissioned by the Environment undertake a flood risk mapping stu Atkins decided to look at the floodii The release of the OpenMI provided culverted reaches (represented in Inf reaches (represented in InfoWorks R level of integration without the OpenI long, complex iterative process in wh passed between both models and th until convergence was reached - a process that might not have yielded a satisfactory result. passes results from one model to the other as they run.

⊞ Read full story

Real time control using OpenMI

A project was set up to optimize a complex real-time control system that ensured wastewater flowing through the Bournemouth sewer system would not pollute the river to which the treated flows were discharged. The aim was that water quality levels in the river should determine the amount of flow that could either be passed through the treatment plant or should be retained in the sewer system. OpenMI was used to link wastewater and river models in order to achieve this highly-sensitive real-time control. Bournemouth is a large catchment served by several large sewage pumping stations and a 5km long coastal interceptor sewer, which

varies between 1m and 2m in diameter and takes flows to the wastewater treatment plant.
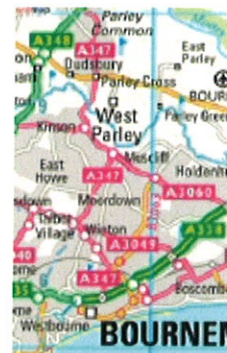
⊞ Read full story

Linked models assess integrated urban flooding interactions in Kenilwortl
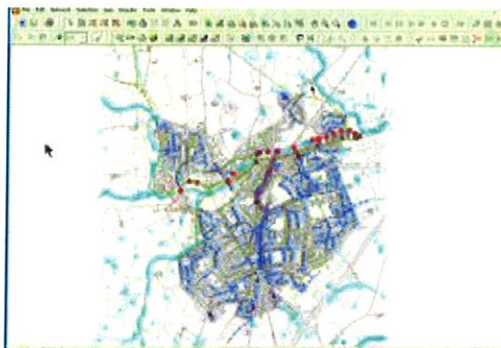
Assessing the impact of sewage disch urban areas to watercourses and watercourse levels on the sewerage approach to modeling. Accordingly residential market town of Kenilworth which had a history of flooding issues both InfoWorks CS and InfoWorks linking of models increased the abili hydraulics. It is possible to model th transfer processes, however unless a this manual transfer is adopted not all feedback interactions are accounted for.

⊞ Read full story

The 2nd OpenMI-Life and Association Workshops were successfully held

Copenhagen, Denmark

▶ OpenMI-Life Documentation Meeting
February 7, 2008
Copenhagen, Denmark

▶ OpenMI Association Dissemination Committee Meeting
March 12, 2008
Delft, the Netherlands

▶ OpenMI 1st Annual General Meeting
March 13, 2008
Delft, the Netherlands

▶ OpenMI Association Executive Committee Meeting
March 13, 2008
Delft, the Netherlands

Web conferences

OpenMI Association Technical Committee Meetings
▶ January 9, 2008
▶ January 16, 2008
▶ January 23, 2008
▶ January 30, 2008
▶ February 12, 2008
▶ February 19, 2008
▶ February 26, 2008
▶ March 5, 2008
▶ March 12, 2008
▶ March 26, 2008

Wallingford, UK

On the 20th and 21st November 2007, the 2nd OpenMI-Life and OpenMI Association Worksh
UK. During the 1st day, linked modelling results were presented from seven applications o
Belgium and Greece. The case studies addressed issues related to the implementation of th
policies. In the morning of the 2nd day, practical applications of integrated modelling v
authorities, consultants and model developers outside the OpenMI-Life project community. I
workshop session was divided into two parts: (a) an open session for developing strategy, v
contribute their views as to how they would like to see both the OpenMI and Association c
OpenMI-Life project members to discuss and work together on project issues.

⊞ Read more about the OpenMI-Life project   ⊞ Download both workshops' presentations

Information Desk Standards Water received OpenMI Training

The Dutch "Information Desk Standards Water" (IDSW)
develops, maintains and promotes several Standards for
Information exchange relevant to Dutch Water
Management. Examples are a data model, data
definitions and exchange formats. Last year, the board
adopted the OpenMI as one of the standards to
promote. Recently Delft Hydraulics provided a one-day
workshop to employees of the IDSW such that the IDSW
can actively promote the OpenMI, can answer basic
questions and can point towards professional help. This
is a major step in promoting OpenMI as the mechanism
for developing integrated systems.

⊞ Read full story (in Dutch)

Portal on useful 'standard management launched

Besides OpenMI there are many c
which are of value to integrated r
There are quite a number of tooll
dictionaries and glossaries arounc
initiatives. But, how can you find
your team's effort? To improve th
a portal has been set up which al
number of links to useful 'standar
the portal is that it is easy to add

⊞ Have a look and feel free to be
community

The OpenMI Association becomes a legal entity

Since the end of the HarmonIT project, the provisional OpenMI Association has taken respor
Open Modelling Interface (the OpenMI). At 11:30 on June 4th 2007, the new Association fir
establishing its Charter and became a legal entity under Dutch Law with its registered off
objectives are to promote the development, use, management and maintenance of the Op
organisations and to all persons who have an interest in the use and development of the Oper

⊞ Read full story

To avoid our emails being seen as junk or spam, please add our "From" address to your Address Book.

OpenMI
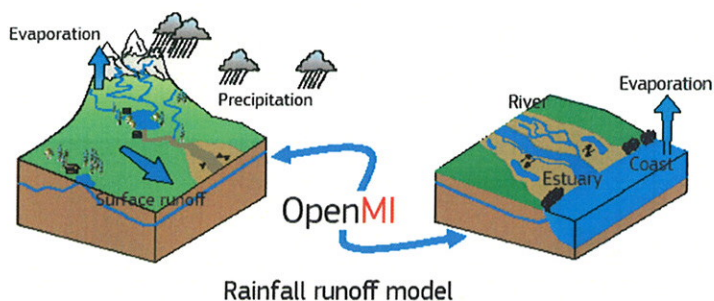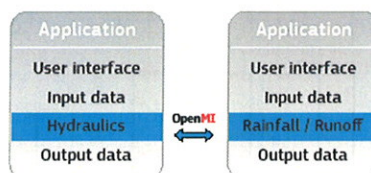
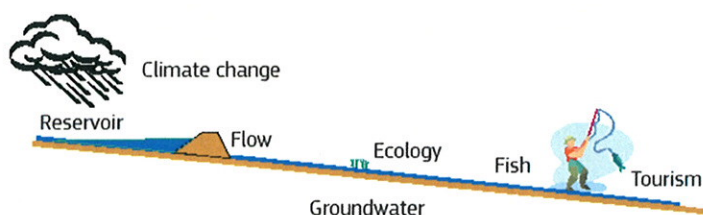# The OpenMI Association

What is the OpenMI?

OpenMI

Rainfall runoff model

An interface standard for run time data exchange between models, databases & tools, **whose purpose is** to improve the ability to model complex scenarios.

How did it come about?

Competition for scarce resources
Need for integrated water management – WFD
Complexity leads to need for decision support
Need for whole catchment models
Need for model linking

What will it do for you?

Simplify integrated modelling for
- Whole earth system science
- Integrated water management

Who is it for?

- The Competent Authorities
- The Modelling Community
- Model Developers

What is the OpenMI Association?

An entirely open group dedicated to maintaining the OpenMI into the future.

What does it do?

- Develops, maintains and promotes the OpenMI.
- Supports the user community.
- Provides information, promotes discussion and listens to feedback.

Why join?

To participate - To learn - To influence

How to join?

Membership application form at www.OpenMI.org

Further information
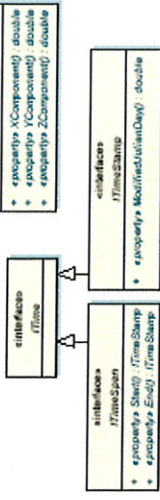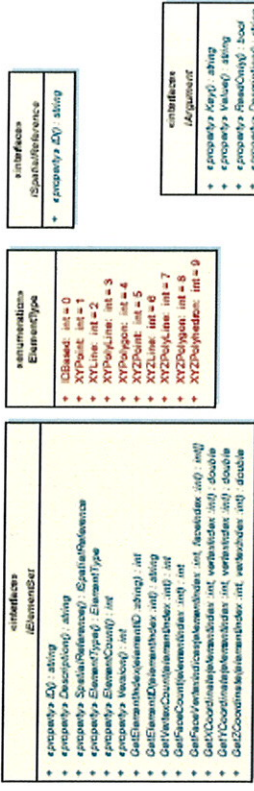
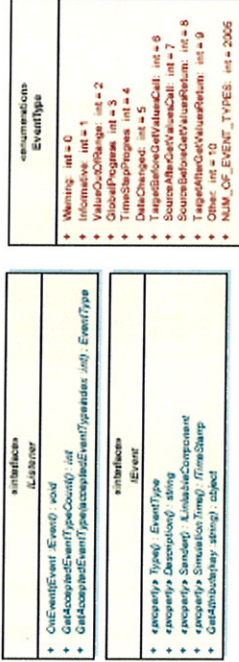secretary@openmi.org / www.openmi.org
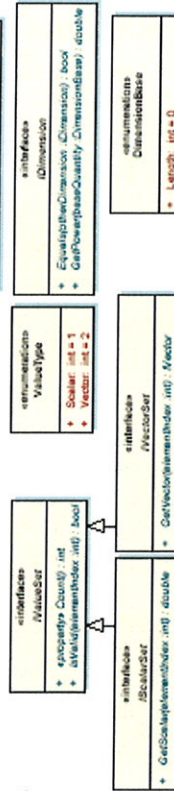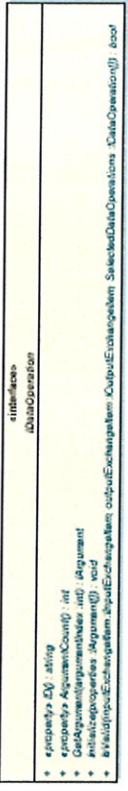
org.OpenMI.Standard interface specification v.1.4.0

December 2007 © The OpenMI Association URL: www.openmi.org