HEARTFAID

D12 – 1st Periodic Report on the Distribution of the Community Contribution among Contractors

Submission date: 09/03/07
Due date of document: 31/01/07

HEARTFAID

A KNOWLEDGE BASED PLATFORM OF SERVICES FOR SUPPORTING MEDICAL-CLINICAL MANAGEMENT OF THE HEART FAILURE WITHIN THE ELDERLY POPULATION

Project summary	
Project acronym:	HEARTFAID
Project identifier:	IST – 2004 – 027107
Duration of the Project:	01/02/2006 – 31/01/2009
Project Co-ordinator Name:	Domenico Conforti
Project Co-ordinator Organisation:	UNICAL University of Calabria (Italy)
Thematic Priority:	Information Society Technology-ICT for Health
Instrument:	Specific Targeted Research Project

Consortium

- UNICAL- Università della Calabria (Italy)
- UNICZ- Università degli studi Magna Graecia di Catanzaro (Italy)
- UNIMIB- Università degli studi di Milano Bicocca (Italy)
- JUMC- Jagiellonian University Medical College (Poland)
- VMWS- Virtual Medical World Solutions Ltd (United Kingdom)
- FORTHNET S. A.- Hellenic Telecommunications and Telematic Applications Company S. A. (Greece)
- SYNAP- Synapsis s.r.l. (Italy)
- CNR- Consiglio Nazionale delle Ricerche (Italy)
- FORTH-Foundation for Research and Technology Hellas (Greece)
- RBI- Rudjer Boskovic Institute (Croatia)
- AUXOL- Istituto Auxologico Italiano (Italy)

D12 – 1st Periodic Report on the Distribution of the Community contribution among contractors

Document summary	
Document Title:	1st Periodic Report on the Distribution of the Community contribution among contractors
Document Classification:	Deliverable D12
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Submission date:	09/ - March – 2007
Due date:	31 January 2007
Authors:	Domenico Conforti (UNICAL) Debora Minardi (UNICAL)
Work package:	WP0 – Management
Report Version:	1.1

Short Description
This deliverable describes the distribution, made by the coordinator, of the Community contribution (prefinancing related to the first 18 months of the project) among all the contractors of Heartfaid project.

Change Record		
Version Number	Changes	Release date
1.0 1.1	First draft of the Document Final Draft	01/03/2007 09/03/2007

Report on the Distribution of the Community's contribution

Type of Instrument	STREP
Project Acronym	HEARTFAID
Contract Number	IST-2005-027107

Part I — Community's first advanced payment sent to the coordinator

First Advanced Payment	
From	To
1/02/2006	31/07/2007

	Date	Amount (A)
Total (X)	5/4/2006	835.900,00

Part II — Distribution of the Community's first advanced payment between contractors

			First Advanced Payment	
Contractor n°	Organisation Short Name	Country Code	Date	Amount
1	UNICAL	IT	5/4/2006	120.232,00
			Total	120.232,00
2	UNICZ	IT	11/4/2006	50.176,00
			Total	50.176,00
3	UNIMIB	IT	11/4/2006	37.212,00
			Total	37.212,00
4	JUMC	PL	12/4/2006	37.441,00
			Total	37.441,00
5	FORTHNET	GR	12/4/2006	116.902,00
			Total	116.902,00
6	SYNAP	IT	20/12/2006	116.864,00
			Total	116.864,00
7	CNR	IT	11/04/2006	81.360,00
			Total	81.360,00
8	FORTH	GR	12/4/2006	66.363,00
			Total	66.363,00

9	RBI	CR	12/4/2006	77.215,00
			Total	**77.215,00**
10	AUXOL	IT	11/4/2006	37.212,00
			Total	**37.212,00**

Part III

Community's prefinancing (or payment) not yet distributed between contractors	**94925,00**

Difference between Community's first advanced payment sent to the coordinator and Total Distribution of the Community's prefinancing between contractors

I certify that the information set out in this form is accurate and correct and agreed by all contractors.

Name *and* Surname	Date	
Domenico Conforti	09/03/2007	

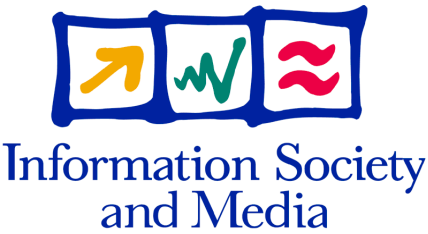
Explanatory notes

The prefinancing for the Contractor Synapsis has been sent by the Coordinator after the removal of clause 9.7 of the Contract, while the amount of € 94925,00 will by the Coordinator until the first review outcome according to the same clause for the Contractor VMWS

HEARTFAID

D13 – 1st Periodic Report
(Activity and Management)

Submission date: 09/03/07
Due date of document: 31/01/07



HEARTFAID

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D13 – 1st Periodic Report (Activity and Management)

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Due date:	31 January 2007
Authors:	Domenico Conforti (UNICAL) Debora Minardi (UNICAL) Vincenzo Lagani (UNICAL) Angela Sciacqua (UNICZ) Cinzia Cherubini (UNIMIB) Katarzyna Styczkiewicz (JUMC) Christos Biniaris (VMWS) Stelios Louloudakis (FORTHNET) Sergio Di Bona (SYNAP) Ovidio Salvetti (CNR) Franco Chiarugi (FORTH) Dragan Gamberger (RBI) Mariaconsuelo Valentini (AUXOL) Luca Grappiolo (AUXOL)
Work package:	WP0 – Management
Report Version:	1.3

Short Description
The document describes in depth the technical activities carried out during the first year of the project by WP and by partners involved. It also gives an overview of the financial efforts and expenditures during the same period.

Change Record		
Version Number	Changes	Release date
1.0	First draft of the Document	16/02/2007
1.1	Contribution from Consortium	05/03/2007
1.2	Minor Changes	07/03/2007
1.3	Final Version	09/03/07

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Executive Summary

A knowledge based platform of services for supporting medical-clinical management of heart failure within elderly population

FP6-IST-2005-027107 - STREP

Project co-ordinator: Prof. Domenico Conforti

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Project Objectives

HEARTFAID is a research and development project aimed at devising, developing and validating an innovative knowledge based platform of services, able to improve early diagnosis and to make more effective the medical-clinical management of Heart Failure within elderly population. The project is taking place with the financial support of the European Community, under the Sixth Framework Program, Information Society Technology – ICT for Health.

Chronic Heart Failure is one of the most remarkable health problems for prevalence and morbidity, especially in the developed western countries, with a strong impact in terms of social and economic effects. All these aspects are typically emphasized within the elderly population, with very frequent hospital admissions and a significant increase of medical costs.

HEARTFAID aims to make more effective and efficient all the processes related to diagnosis, prognosis and treatment of the Heart Failure within elderly population.

This general goal will be achieved by developing and providing an innovative technological platform that:

- integrate biomedical data within electronic health record systems, for easy and ubiquitous access to heterogeneous patients data;
- provide services for healthcare professionals, including patient telemonitoring, signal and image processing, alert and alarm system;
- support clinical decision in the heart failure domain, based on pattern recognition in historical data, knowledge discovery analysis and inferences on patients' clinical data.

The system functionalities and services provided by the HEARTFAID platform are sketched in the following figure.

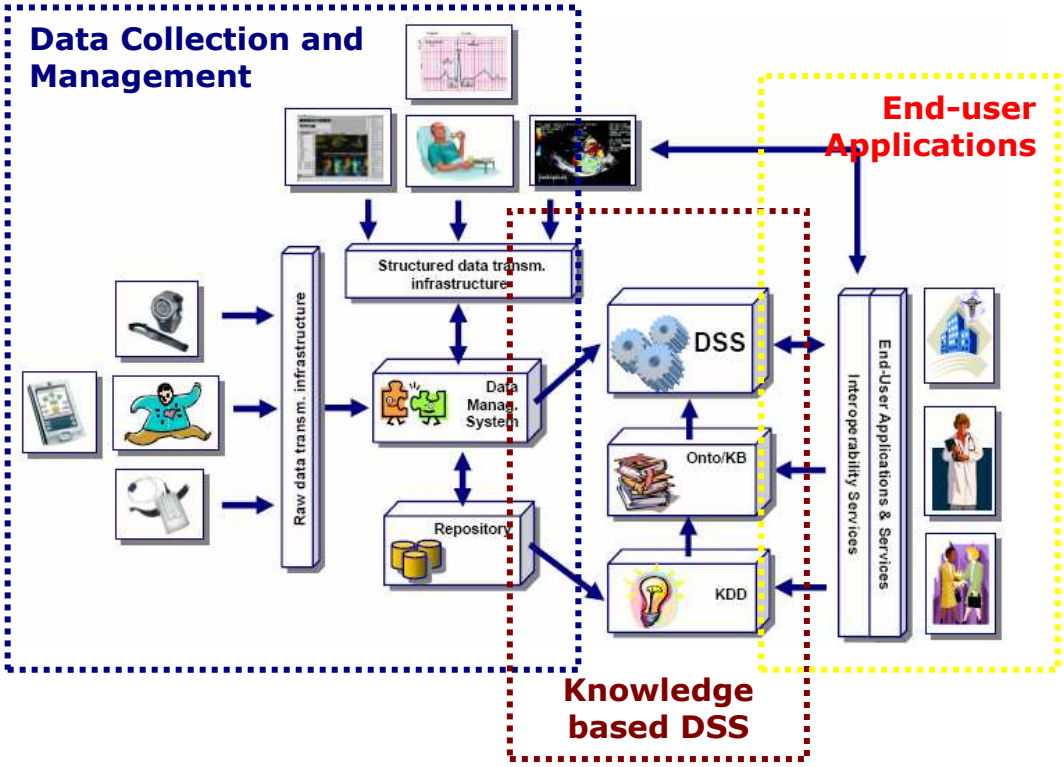


Figure 1. *HEARTFAID System Functionalities and Services*

Expected End Results

The HEARTFAID platform will result in the following technological innovations and realizations:

- middleware infrastructure for interoperability and biomedical data acquisition and integration;
- integration of several approaches for coding the relevant medical knowledge and extracting new knowledge;
- innovative approaches for biomedical signal and image processing;
- medical and clinical decision support of all the key steps in the clinical management of HF patients.

In terms of architectural organization, the HEARTFAID platform will be realized on the basis of the following macro components:

- multi-channel data acquisition and transmission;
- interoperability/integration middleware and use of clinical data representation and communication standards;
- medical and clinical knowledge generation and management;
- decision support services and biomedical data processing;
- end-user services and applications.

Impact

HEARTFAID strategic impact mainly regards the improvement of the quality of life of Heart Failure patients and the decreasing of the social and economic costs.
HEARTFAID applications will bring an important increase of the treatment quality of the individual patient, by ensuring the possibility to personalize the therapy and have a real-time monitoring and assistance of the patient.
On the other hand, the optimization of the therapy processes will assure the control and reduction of the overall economic and social costs of medical care, by decreasing the frequency of hospital admissions.
The following graphic (Fig. 2) gives a "synoptic" view of the "patient-centric" organization and delivery of the services provided by the HEARTFAID platform. Under this respect, the HEARTFAID platform turns out to be an effective and efficient support of a patient-centric Heart Failure care program.

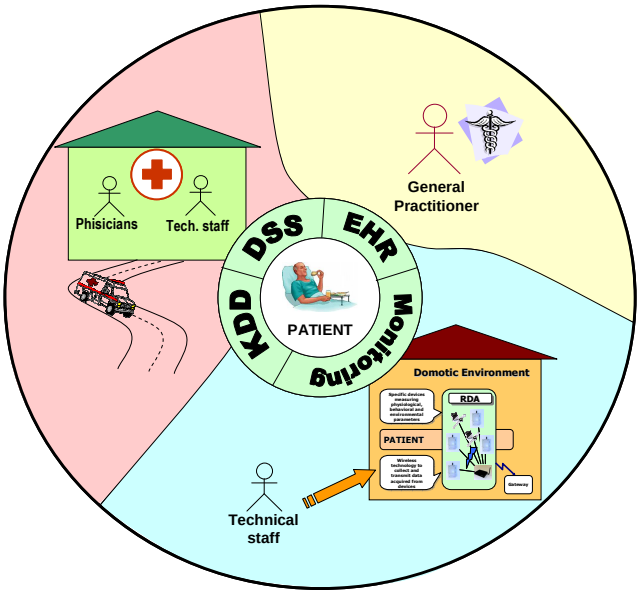


Figure 2. *The patient-centric architecture of the HEARTFAID platform of services*

Using and Disseminating of Knowledge

As far as the "*using knowledge*" issues are concerned, since HEARTFAID is a project mostly implementation oriented, theoretical and methodological work will be rapidly converted to experimental and practical applications. The industrial

partners will develop a detailed exploitation plan in the course of the project, based on the following steps: identification of the market segments; detailed business plan; detailed identification of the potential markets and the competitive environment; assessment of benefits by end-users; establishment of a commercial agreement among partners on the joint commercialization and exploitation after project end; after project completion, development of the prototypes into industrial products.

As far as the "*disseminating knowledge*" issues are concerned, it is of strong interest to the HEARTFAID project and its partners to disseminate its ideas and results to a community as wide as possible. Dissemination is an important interactive interface for the project for getting continued feedback on ideas and concept refinement. Dissemination is performed whenever possible by exploiting the human network of the different partners, but more specific it will be done according to the following points: Internal Dissemination, Project Web Site, User Interest Groups, Conferences Exhibitions, Intermediaries, Scientific and Technical Publications, Concertation and Clustering activities.

Consortium

The Consortium has been established with the aim to get a well-balanced combination providing all needed expertise, at a very high level of specialisation, in different topics. The consortium is based on 11 partners: 6 from Italy (University of Calabria, University "Magna Graecia" of Catanzaro, University of Milano Bicocca, Synapsis S.r.l., National Research Council, Auxologico Institute), 2 from Greece (Hellenic Telecommunications and Telematics Applications Company S.A., Foundation for Research and Technology Hellas), 1 from United Kingdom (Virtual Medical World Solutions Ltd.), 1 from Poland (Jagiellonian University Medical College) and 1 from Croatia (Rudjer Boskovic Institute). As far as the expertise and the contributions to the project are concerned, 4 partners come from the relevant medical domain (Cardiology Divisions of public hospitals), whereas the other 7 are related to the methodological and technological domain.

Work performed and Results achieved during the First Reporting Period

- Analysis of the Heart Failure medical-clinical domain, in terms of systematic description of the all relevant medical and clinical processes.
- Definition of a suitable set of medical and clinical decision making problems.
- Identification of the relevant characteristics of the clinical validation sites and devising of the platform use case scenarios.
- Devising of new approaches for the organization and delivery of the health care delivery within Heart Failure domain.
- Identification of all the relevant biomedical data.
- Definition of the requirements and functional specifications of the data acquisition and communication infrastructure.
- Definition of the requirements and functional specifications of the middleware infrastructure.
- Preliminary definition of data preparation and data warehousing procedures.
- Preliminary design and development of relevant medical ontologies.

- Definition of the requirements and functional specifications of the data processing system and DSS.
- Preliminary definition of the end-user services interaction functionalities.

PERIODIC ACTIVITY REPORT

Section 1 – Project objectives and major achievements during the reporting period

Overview of General Project Objectives

Heart Failure (HF) is a complex clinical syndrome where the heart is unable to pump sufficient blood to cover the body's metabolic needs. The incidence, prevalence, morbidity, mortality, and economic costs of HF are considerable. In the USA, for example, the total annual cost of treating heart failure patients is estimated to total $60 billion.

Although there is some variation in the reported prevalence of HF, overall data demonstrates that the prevalence of clinically overt HF increases considerably with age and that the prevalence of HF has increased over the past few decades.
In Europe almost 10 million patients have HF, and approximately three-quarters of these will be admitted to hospital at least twice a year. In the USA an estimated 5 million patients have HF, and nearly 500,000 new cases are diagnosed each year.

The disorder is the underlying reason for 12 to 15 million office visits and 6.5 million hospital days each year. During the last 10 years the annual number of hospitalisations has increased from approximately 550,000 to nearly 900,000 for HF as a primary diagnosis and from 1.7 to 2.6 million for HF as a primary or secondary diagnosis. Nearly 300,000 patients die of HF as a primary or contributory cause each year, and the number of deaths has increased steadily despite advances in treatment.

The prognosis of HF is uniformly poor. Half of patients carrying a diagnosis of HF will die within 4 years and patients with severe HF approximately 50% will die within 1 year. In fact data suggests that the mortality associated with HF is comparable to cancer. The Framingham studies demonstrated that the probability of someone with a diagnosis of HF dying within five years was approximately 70% in men and 40% in women. In comparison, five year survival for all cancers among men and women in the USA during the same period was approximately 50%.

The diagnosis of HF can be made based on patients' history, physical examination and appropriate investigations objectively confirming cardiac dysfunction (preferably echocardiography). Another tests are usually performed to confirm the diagnosis. These include a chest X-ray, an electrocardiogram (ECG) and measurement of natriuretic peptide. However to provide proper prognosis and to optimise treatment, accurate diagnosis of HF and establishment of aetiological factors is crucial.

Management of HF is aimed at treating symptoms and preventing further deterioration in cardiac function. Optimal treatment can improve prognosis and prolong life. The therapeutic approach in HF due to systolic cardiac dysfunction consists of non-pharmacological management (general advice, cardiac rehabilitation), pharmacological therapy, mechanical devices and surgery

(including revascularization procedures, resynchronization therapy, mitral valve surgery, cardiomyoplasty, cardiac transplantation etc). A variety of drugs are used in the treatment of HF including diuretics, ACE (angiotensin converting enzyme) inhibitors, ACE receptor antagonists, aldosterone receptor antagonists, beta-blockers, cardiac glycosides, positive inotropic agents.

On this basis, optimal management, particularly in elderly patients, requires an effective and integrated disease care program, capable of:

- making treatment more effective, appropriate and personalised;
- reducing the risk for adverse events by creating real-time monitoring and assistance to HF patients;
- controlling and reducing the overall economic and social costs of medical care by decreasing the frequency of hospital admissions.

This requires in-depth knowledge of an individual patient and early detection of the signs and symptoms related to HF accompanied by prompt treatment.

The achievements of these objectives, requires the identification, collection, integration and processing of a complex amount of biomedical data and information from the patient on several levels: molecular, cellular, tissue, organ and personal/clinical levels (relevant patient history, pertinent signs and symptoms, risk factors, lifestyle, etc).

HEARTFAID aims to achieve these objectives by developing and deploying an innovative computerised system. The technological platform provides information and decision support to make diagnosis and management of individual patients more personalised and effective. It does this by exploiting computational modelling, knowledge discovery methodologies, visualisation and imaging techniques, medical domain knowledge, and effectively integrating and processing biomedical data and information at different levels. In addition it will help develop and define new healthcare delivery organisation and management models for HF, to produce more effective and efficient use of available resources (healthcare staff, healthcare equipment and financial resources).

The main goal of HEARTFAID is to support health care operators in the management of patients with HF and in particular to improve the quality of life for elderly patients, and reduce the number of their hospitalisations. To achieve these objectives, the following requirements must be met:

- easy access to heterogeneous patient data;
- a common user interface of integrated and easy-to-use services for healthcare professionals;
- easy access to formalised clinical knowledge (declarative knowledge, procedural knowledge, and newly discovered knowledge).

In fact, the core of HEARTFAID platform is the Knowledge Level, formalizing all the pre-existing clinical knowledge about HF. Novel, useful and non-trivial knowledge is extracted from the Knowledge Base and the data collected during the project, by using innovative Knowledge Discovery processes.
If the Knowledge Base represents the “heart” of HEARTFAID platform, the “brain” of the platform is the Decision Support Systems (DSS). The DSS has the

main goal to provide a valid support to the health care operators and the decision makers operating in the field of HF disease.
To ensure the reliability and the correctness of the whole system, the clinical partners will carry out an intensive validation of the platform functionalities.

In terms of scientific and technological advances provides by HEARTFAID, it is worth while to observe that, differently from other previous and current projects on the management of HF patients, HEARTFAID is specifically characterized by the following potential innovations:

- acquisition and integration of heterogeneous biomedical data, relevant to the medical domain, of different structure and complexity and coming from different and several sources;
- interoperability/integration middleware and use of clinical data representation and communication standards;
- integration of several approaches for coding the relevant medical knowledge and extract new knowledge: a knowledge based approach (deductive knowledge) for coding the clinical guide lines and the clinical best practice; a knowledge discovery approach (inductive knowledge) for extracting new knowledge from the practical clinical experience represented by suitable sets of cases;
- innovative approaches for biomedical signal and image processing;
- medical decision support level, characterized by functionalities regarding all the clinical management of HF patient: diagnosis, prognosis, therapy planning.

First Reporting Period (Months 1-12)

As far as the scientific and technical activities are concerned, the first reporting period (months 1-12) of the HEARTFAID project has been mainly characterized by the deep analysis of the medical domain and by the definition of the requirements and functional specifications of the main components of the platform (data acquisition and communication infrastructure, middleware for data integration and interoperability, data processing and DSS services), in line with the overall objectives of the period.

More specifically:

- The HF medical domain has been explored by an intensive activities, mainly carried out by the clinical partners (UNICZ, UNIMIB, JUMC. AUXOL), with the valuable contribution of UNICAL and the support of all the other technical partners. The main achievements have been:

  - Systematic description of the HF medical and clinical processes, by the definition of the relevant patient's workflows.
  - For each patient's workflow, identification of a set of medical and clinical decision making problems, very challenging in term of complexity and impact on the effectiveness of the patient's mangement.

- Analysis of the state-of-the-art and definition of new models and approaches for the organization and delivery of the health care within HF domain.
- Identification of the relevant characteristics of the clinical validation sites (Catanzaro – Italy, Milan – Italy, Krakow – Poland) and devising of the platform use case scenarios. This activity has been proposed and carried out mainly by the partners SYNAP, CNR and FORTH.

- The definition of the requirements and functional specifications of the main components of the platform has been carried out on the basis of the results from the HF medical domain analysis and following the most innovative achievements of the relevant technologies. All the partners have been involved in this important activity and the main achievements have been:

  - Identification of the set of biomedical data, signs and symptoms relevant to the HF medical domain and more related to the selected medical decision making problems.
  - Definition of the requirements and functional specifications of the data acquisition and communication infrastructure.
  - Definition of the requirements and functional specifications of the middleware infrastructure.
  - Preliminary definition of data preparation and data warehousing procedures.
  - Preliminary design and development of relevant medical ontologies.
  - Definition of the requirements and functional specifications of the data processing system and DSS.
  - Preliminary definition of the end-user services interaction functionalities.

Section 2 – Workpackage Progress of the Period

WP1 – HEART FAILURE DOMAIN ANALYSIS

WORK PACKAGE: 1			
TITLE: HEART FAILURE DOMAIN ANALYSIS			
START DATE: MONTH 1			
WORK PACKAGE LEADER: UNICZ (13MMS)			
PARTNERS INVOLVED:UNICAL (7MMS),UNIMIB (5MMS), JUMC (11MMS), AUXOL (6MMS)			
MEETINGS & ATTENDANTS	PLACE	DATE	ACHIEVEMENT
UNICAL/UNICZ	Cosenza	16/03/06	Planning of the activity and first analysis of the requirements
UNICAL/UNICZ/UNIMIB/JUMC/AUXOL	Krakow	09/04/06	Further planning of the activities and analysis of the requirements
UNICAL/UNICZ	Catanzaro	July 19 2006	Definition and formalization of some medical decision making problems

OBJECTIVES AND ACHIEVEMENTS OF THE TASKS DUE IN THE PERIOD

TASKS AND OBJECTIVES	ACHIEVEMENTS	ACTIVITIES
T 1.1 – Define the medical and clinical requirements	Analysis of the medical and clinical processes in the domain	The task has started at M1. The progress of the task was in line with the objectives of the work plan. The activity related to task 1.1 has been characterized by the analysis of the medical and clinical processes in the heart failure domain. The HF medical domain has been explored by an intensive activities, mainly carried out by the clinical partners with the important support of all the other technical partners. The work has been structured on a deep analysis of the medical and clinical procedures of the relevant domain, from the study of the most recent European Society of Cardiology (ESC) Guidelines and from protocols for the evaluation and clinical management of HF patients, and from the relevant results of the evidence based medicine in HF domain. Hence, the partners have defined the specific identification, formulation and assessment of all the requirements relevant to the HF domain. This activity has allowed to develop the Task 1.2. The activities of Task 1.1 started at M1 and were completed at M3, inline with the Gantt Chart of the project.
T 1.2 – Formulate the relevant medical decision making problems	Problem statement and formulation of the relevant decision making problems	The activities of this Task were started at M2 and ended within M5 inline with the Gantt of the Project. This task has been based on the analysis performed in the previous task. In task 1.2 the partners have defined the decision making problems that the several health care operators, involved in the clinical management of HF patients, must face and solve in an effective and efficient way. A systematic description of the HF medical and clinical

		processes has been provided, by the definition of the relevant patient's workflows in different health care environments. For each patient's workflow, the partners have identified a set of medical and clinical decision making problems, very challenging in term of complexity and impact on the effectiveness of the patient's treatment. Moreover, the early identification of the symptoms of decompensation of heart failure patients has been considered and emphasized, for the remarkable impact in terms of hospitalization costs reduction and clinical outcome improvement. The developing of T 1.1 and T 1.2 has allowed to define and formulate the deliverable D5.
T 1.3 – Formulate new organization and management models for the health care delivery	Development of the organization and management models for the healthcare delivery	The task has been started in line with the Gantt at M3 and has been achieved on time. This activity has concerned the devising and development of new organization and management models, on the basis of which define more effective and efficient heart failure care programs. These models are related to the organization of the care programs on a given territory, the coordination and collaboration of all the health care operators involved (practitioners, professional nurses, hospital physicians, geriatrics, cardiologists), the integration of health care environments (home, primary ambulatory, territorial ambulatory, hospital). In relation to the HEARTFAID care model the importance of Patient and Care Team empowerment has been particularly emphasized. The principal and new concepts introduced in the model are the Virtual Medical Team and the Care Coordinator. The Virtual Medical Team represents a group of medical and non medical figures that are directly related to the care of the heart failure patient. It is "Virtual" since its members could belong to different health environments, and its functions will be assured and supported by ICT tools. The Care Coordinator is a medical figure responsible of all the phases of patient care process and compose and organize the virtual care team. The work for T1.3 has allowed to define Deliverable D8

STATUS OF DELIVERABLES AND MILESTONES OF THE PERIOD

DELIVERABLE	COMMENTS
D5 – Medical-Clinical processes and requirements in HF domain and formulation of the decision making problems	The deliverable has been successfully completed and submitted within the foreseen deadline with the contribution of all partners involved. This document describes the clinical State of Art of the Heart Failure field. Starting from a deep analysis of the medical and clinical procedures of the relevant domain, from the study of the ESC guidelines, from the protocols for the evaluation and clinical management of HF patients, and from the relevant results of the evidence based medicine in HF domain, the partners give a complete and detailed description of the whole medical knowledge related to heart failure syndrome, with a particular attention to the definition of diagnostic and care processes. In its final part the document lists the principal decision making problems that clinicians face during the treatment of Heart Failure patients. The problems statements will be a invaluable support in order to define the structure and the services of HEARTFAID platform.

D8 – Definition and formulation of the organization and management models for the healthcare Delivery	The deliverable has been achieved on time for submission on November 11. Starting from a deep analysis of the literature and the currently implemented Heart Failure Care Programs, this document describes the proposal of an innovative health care management program for patients with heart failure. The deliverable gives a complete and detailed description of the management care programs related to heart failure, with a particular attention to the definition of a new integrated Heart Failure Program, supported by the HEARTFAID platform.
MILESTONES	
MS 1.1 - Identification of medical-clinical requirements and relevant decision making problems	The identification of medical-clinical requirements and relevant decision making problems have been defined and they are reported into deliverable D5
MS 1.2 - Definition of new models for healthcare delivery processes	The definition of new models for healthcare delivery processes has been discussed and defined into deliverable D8

WP2 – BIOMEDICAL DATA IDENTIFICATION AND COLLECTION

WORK PACKAGE: 2
TITLE: BIOMEDICAL DATA IDENTIFICATION AND COLLECTION
START DATE: MONTH 3
WORK PACKAGE LEADER: VMWS (37MMS)
PARTNERS INVOLVED: UNICAL (1MM), UNICZ(5MMs), UNIMIB(6MMs), JUMC (3MMs), FORTHNET (16MMS), SYNAP(8MMs), AUXOL (6MMs)

OBJECTIVES AND ACHIEVEMENTS OF THE TASKS DUE IN THE PERIOD

TASKS AND OBJECTIVES	ACHIEVEMENTS	ACTIVITIES
T 2.1 – Define the set of the relevant biomedical data, signs and symptoms	Identification of all biomedical data, signs and symptoms relevant to the hearth failure pathology	The task has started at M3. The progress of the task was in line with the objectives of the work plan. The partners have defined all the BM signs and symptoms. Furthermore, this process will lead to the definition of the sensors/devices which will be used for the data acquisition The activities of Task 2.1 started at M3 and were completed at M7, inline with the Gantt Chart of the project. T2.1 gives a general overview of the most relevant biomedical signs, symptoms and data in the heart failure domain with specification of the environments in which they could be collected.
T2.2 – Design and development of the data Acquisition and Transmission Infrastructure	Definition of the requirements and the functional specifications of the data acquisition and transmission infrastructure	The task has started at M3. Each partner has performed a study of the enabling technologies related to the design of the data acquisition and transmission infrastructure. Furthermore, some generic software modules that will enable the data acquisition and transmission have been developed. There are no unforeseen delays or deviations from the work plan. The programming interfaces and data formats that will be applied for data transmission have been defined. Transmission of dummy data has been performed in order to ensure the proper functionality of the data transmission process. The development of software modules to support data acquisition and transmission has progressed as expected.. Furthermore, regarding the Heartfaid Electronic Patient Record, a first mock-up of the EPR was made available to the Italian clinical partners and a process of internationalisation of the available solution was started.. Finally, the set of sensors which will be integrated into HEARTFAID is close to its final definition. The first stage of integration of some medical devices into the HEARTFAID platform has started and some mockups have already been developed The specifications of the data acquisition and transmission infrastructure have been defined and they are reported into D14. In the next 3 months it is expected that the partners, based on the definition of the specifications of the data acquisition and transmission infrastructure, will continue with the development of the various modules of the infrastructure, and standalone tests will start being performed in order to verify the desired operation of the modules.

STATUS OF DELIVERABLES AND MILESTONES OF THE PERIOD

DELIVERABLE	COMMENTS
D9 – Specifications of all biomedical data, signs and symptoms relevant to the heart failure	Deliverable D9, based on the most recent ESC 2005 CHF guidelines, in line with the HEARTFAID deliverable D5 and medical partners' clinical experience in heart failure domain, describes the biomedical data, signs and symptoms grouped in a logical fashion. They are listed according to their relevance to the diagnosis, management and research in the field of HF. Deliverable D9, is jointly prepared by WP2 Partners and will be submitted after the conclusion of the HEARTFAID STAB meeting in Pisa.
D14 – Specifications of Data acquisition and transmission infrastructure	Deliverable D14 describes the requirements and specifications of the infrastructure which will be responsible to gather biomedical data from sensors in all the relevant healthcare environments and transmit these data to the HEARTFAID platform. D14 is jointly prepared by the technological partners involved in WP2 and will be submitted at the end of this reporting period.
MILESTONE	
MS 2.1 – Functional Specifications of the Data acquisition and transmission infrastructure	The functional specifications of the data acquisition and transmission infrastructure have been defined and they are reported into deliverable D14.

WP 3 – MIDDLEWARE, INTEROPERABILITY AND INTEGRATION

WORK PACKAGE: 3
TITLE: MIDDLEWARE,INTEROPERABILITY AND INTEGRATION
START DATE: MONTH 2
WORK PACKAGE LEADER: SYNAPSIS (17MMS)
PARTNERS INVOLVED: VMWS (11MMS), FORTHNET (7MMS), CNR (3MMS), FORTH (6MMS)

OBJECTIVES AND ACHIEVEMENTS OF THE TASKS DUE IN THE PERIOD

TASKS AND OBJECTIVES	ACHIEVEMENTS	ACTIVITIES
T 3.1 - Middleware requirements and functional specifications	Identification of all the requirements and functional specifications of the middleware infrastructure.	The task has been started at month M3, inline with the Gantt of the Project and ended at month M10, inline with the Gantt of the Project. The requirements and functional specification identified during this task represent a significant input to the activities of the connected Task T3.3. Meetings with CNR both in Pisa and Livorno supported the identification of critical aspects concerning the location (distributed or centralised) of source data, which might arise during the subsequent stages of the project activities. These aspects have been discussed in details during the General Assembly Meeting held in Pisa during month M10 (7^{th}-10^{th} November 2006). The requirements and the functional specification identified were accurately analysed and described in Deliverable D11.
T3.2 – Identification of the clinical standards for representation and communication of data	Analysis of the available standards.	The activities of this task started at month M8 and ended at month M12, as expected from the Gantt of the Project. An accurate analysis of the available standards was performed and the results are presented in Deliverable D11.
T3.3 – Integration Middleware (ST 3.3.1)	Preliminary definition of the data management system.	The subtask 3.3.1 has been started at month M6, inline with the Gantt of the Project. Early results are expected during the second year of the project lifetime.
T3.4 - Interoperability Middleware	Preliminary mock-up of the middleware infrastructure for interoperability.	Task T3.4 started at month M8, as expected from the Gantt of the Project. The activities of this task and the results expected have been discussed during the Assembly Meeting held in Pisa. During the meeting, early results have been presented to the Consortium and a very early mock-up of the middleware was shown. Further results are expected during the second year of the project lifetime.

STATUS OF DELIVERABLES AND MILESTONES OF THE PERIOD

DELIVERABLE	COMMENTS
D11 – Functional specifications of the middleware	The deliverable was delivered with a slight delay with respect to the foreseen deadline (22^{nd} January instead of 15^{th} January). It defines all the requirements and the functional specifications of the middleware infrastructure.

MILESTONE	
MS 3.1 – Functional specifications of the Middleware and identification of the clinical standards	The functional specifications of the data acquisition and transmission infrastructure have been defined and they are reported into deliverable D14. This milestone has been achieved by month M12, in line with the Gantt of the Project The functional specifications of the middleware and the clinical standards available on the market have been examined against the needs of the HEARTFAID project and the goals to be achieved. Moreover, preliminary design models have been proposed for the future development of the HEARTFAID Middleware.

WP 4 – KNOWLEDGE REPRESENTATION, DISCOVERY AND MANAGEMENT

WORK PACKAGE: 4
TITLE: KNOWLEDGE, REPRESENTATION, DISCOVERY AND MANAGEMENT
START DATE: MONTH 8
WORK PACKAGE LEADER: RBI (8MMS)
PARTNERS INVOLVED: UNICAL (6MMS), SYNAP (1MMS), CNR (3MMS), FORTH (3MMS)

OBJECTIVES AND ACHIEVEMENTS OF THE TASKS DUE IN THE PERIOD

TASKS AND OBJECTIVES	ACHIEVEMENTS	ACTIVITIES
T4.1 - Realization of data warehousing system	Implementation of a suitable data warehouse for knowledge discovery	Analysis of the activities required by the task. Interplay with other tasks, especially those in WP4. Identification of data sources and goals of knowledge discovery process. Detection of relevant data warehouse tasks from the Case report form and D5. Search for historical data by medical partners and publicly available data related to HF. Understanding of the case report form for HF patients. Preparation of the ontological definition of the case report form. Understanding of relevant decision problems in the HF domain. Analysis and definition of data warehousing tasks in medical domains in contrast to business domains. Experiments with available brain stroke data. First experiments with historical data from UNICZ. Search for available public domain software for data warehousing.
T 4.2 – Data understanding, data formatting and data cleansing	Data understanding and preparation	Analysis of the organization and management models for HF domain, as well as formal identification of decision making problems. Preparing the data transformation and data cleansing methodology and its testing on historical data. Experiments with contrast set mining and descriptive induction methods for insightful data analysis in the brain stroke domain. Understanding and preparation of historical data from UNICZ. Application and verification of noise detection algorithms on historical data.
T 4.3 – Definition of machine learning algorithms	Preliminary application of machine learning algorithms	Development and application of the coexisting factor detection methodology for data understanding, modelling, and decision support. Experiments with contrast sets methodology on historical data. Experiments with Kernel based Support Vector Machine algorithms will be started on the datasets from UNICZ.
T 4.4 – Definition of ontologies and medical knowledge base	Preliminary realization of relevant medical ontologies	Overview of medical knowledge representation approaches, especially those for guideline implementation. Overview of ontological approaches for the knowledge conceptualization. Building the first HF ontology in Protégé frames form. HF ontology set on-line on http://lis.irb.hr/heartfaid/ontology/ and prepared in the OWL form. Experiments with integration of the HF ontology with more general public ontologies. Experiments with distribution of the HF ontology in a distributed form. Experiments with JESS based reasoning directly connected with an experimental database. Experiments with the rule part of the knowledge base in

		the SWRL form. Experimental integration of ontologies and decision support system. Presentation of procedural HF related medical knowledge in the form of medical plans. Prepared two publications related to ontologies and their application

WP 5 – DATA PROCESSING AND DECISION SUPPORT SERVICES

WORK PACKAGE: 5
TITLE: DATA PROCESSING AND DECISION SUPPORT DEVICES
START DATE: MONTH 5
WORK PACKAGE LEADER: CNR (18MMS)
PARTNERS INVOLVED: UNICAL (7MMS),UNICZ (2MMS), SYNAPSIS (4MMS), FORTH (5MMS)

MEETINGS & ATTENDANTS	PLACE	DATE	ACHIEVEMENT
CNR/SYNAPSIS	Pisa	Nov 06 Dec 06	Discussion on requirements and functional specifications of HF platform and the interaction between DSS and Middleware

OBJECTIVES AND ACHIEVEMENTS OF THE TASKS DUE IN THE PERIOD

TASKS AND OBJECTIVES	ACHIEVEMENTS	ACTIVITIES
T 5.1 - Identification of representation features for signals and images processing	Identification of representation features and development of algorithms for feature extraction for signals and images processing	Analysis of the activities required by the task, and of the relations and interplay with other tasks. Task scheduling and identification of task leader. Examination of the ESC and ACC/AHA Guidelines in order to identify and extract signals, images and parameters useful for diagnosis and monitoring. Study of models and processing techniques applicable to analyse the HF data. First tests on algorithms developed for quantitative measuring on cardiac MRI sequences. Refinement of the general task organization. Definition of the activities schedule. Research themes identification, in particular, 1D vs. 2D/3D signals and features assessment and extraction. Critical analysis of the characteristics of the devices useful for data acquisition. Improvement of the analysis of the representation features for the signals and images.
T 5.3 – Requirements and functional specification of the Decision Support System	Definition and formalization of the requirements and functional specification of the Decision Support System	Analysis of the activities required by the task, and of the relations and interplay with other tasks. Task scheduling and identification of task leader. Discussion and individuation of the DSS functional requirements, supported by the analysis of the HF scenarios and the identification of the HF cycle consisting in *measurements*, *analysis*, *decisions* and *actions*. Extensive investigation of the technologies and methodologies SOAs for the development of a Clinical Decision Support System. Study and analysis of the CDSS design issues, in particular of problem domain investigation, knowledge representation and inference engine development. Examination of the available open-source instruments for supporting the CDSS development activity. Refinement of the general task organization. Specific research activities concerning global workflow vs. DSS architecture, methodologies vs. technologies. Deep investigation of the SOA from the point of view of the relationship between possible methods and available

		technology. Design issues assessment. Collection of the available instruments. This Task has been concluded on 31st January 2007. Comprehensive definition of the HF CDSS requirements has been debated. The functional specifications, which the DSS should supply to fulfil the requirements, have been detailed also according to the suitable design methodologies. HF CDSS success factors have been deeply investigated. A logical-functional HF CDSS architecture (core components and interrelations with the other HF platform modules) have been defined.

STATUS OF DELIVERABLES AND MILESTONES OF THE PERIOD

DELIVERABLE	COMMENTS
D15 – Functional specifications of data processing and decision support services	D15 reports the results of the studies carried out from Month 5. It includes all the details regarding signal and image features identification and representation useful to build suitable computational models for their detection in practice. Furthermore, D15 also describe the DSS complete requirements for its implementation.

WP 6 – END-USER APPLICATION AND SERVICES

WORK PACKAGE: 6
TITLE: END-USER APPLICATION AND SERVICES
START DATE: MONTH 10
WORK PACKAGE LEADER: FORTHNET (3MMS)
PARTNERS INVOLVED: UNIMIB (1MMS), JUMC (1MMS), SYNAP (3MMS), RBI (2MMS)

OBJECTIVES AND ACHIEVEMENTS OF THE TASKS DUE IN THE PERIOD

TASKS AND OBJECTIVES	ACHIEVEMENTS	ACTIVITIES
T 6.1 - Design end-User Services Interaction Functionalities	Identification of the requirements for the end user interfaces	The activities of Task 6.1 started at M10 and will be completed at M16, inline with the Gantt Chart of the project. By this activity we define a set of high level services necessary for the users to interact with the Heartfaid platform and its functionalities, namely, the clinical decision support system, the knowledge base and the patient data, in a user-oriented and user-friendly fashion. Furthermore, the requirements for the integration of the developed services are also included in this Task.
T 6.3 – Knowledge discovery system for web-based data extraction and analysis	Preliminary definition of the functional specifications of the KDD interfaces	The activities of Task 6.3 started at M10 and will be completed at M22. This Task refers to the development and provision of an on-line platform that supports the analysis of the available data, using suitable tools in order to implement processes for knowledge discovery in the databases of the Heartfaid platform. These tools will also provide the final users (expert users only) with the possibility of performing statistical analysis and implementing complete processes using a range of both traditional and innovative data-mining algorithms.

WP 8 – DISSEMINATION AND EXPLOITATION

WORK PACKAGE: 8
TITLE: DISSEMINATION AND EXPLOITATION
START DATE: MONTH 1
WORK PACKAGE LEADER: UNICAL (1MM)
PARTNERS INVOLVED: UNICZ (0.5MM), JUMC (0.5MM), CNR (0.5MM), FORTH (0.5MM), RBI (0.5MM), AUXOL(0.5MM)

OBJECTIVES AND ACHIEVEMENTS OF THE TASKS DUE IN THE PERIOD

TASKS AND OBJECTIVES	ACHIEVEMENTS	ACTIVITIES
T 8.1 – Disseminate the current activities and results of the project	Scientific publications. Partecipation to conferences and workshops. Interaction with professional medical associations. Project Web Site. Press releases.	The dissemination activities of the first reporting period of the project have been carried out according to the planning defined in the deliverable D6. In particular, the activities have been run on the basis of the following issues: - Internal Dissemination: each partner has organised internal dissemination activities (seminars, press releases, relevant information published on the own web site), with the aim to improve the general awareness about Heartfaid within their own institutions. - Project Web Site: the project web site has been established and is currently under revision and improvement. All public deliverables will be available on the site. Special pages are under construction and will be devoted to the dissemination of the results of the project. - Conferences Exhibitions and Scientific Publications: as it has been reported in the next table, many partners have presented the project at European and national conferences and exhibitions. Moreover, some scientific papers have been already published or submitted to peer review journals. - Clustering and Concertation Meetings: the coordinator partner has participated in clustering and concertation meetings organized by the Commission. - Intermediaries: contacts have established with the following health care professional associations with the aim to keep informed about the Heartfaid activities: ANMCO (Italian Association of Hospital Cardiologists), SIC (Italian Society of Cardiology), SIMI (Italian Society of Internal Medicine).

STATUS OF DELIVERABLES AND MILESTONES OF THE PERIOD

DELIVERABLES	COMMENTS
D 6 - Early plan for Using and Disseminating Knowledge	Completed in line with Annex I
D16 - First Report on Dissemination activities	Completed in line with Annex I
MS 8.1 Dissemination Plan	Achieved

DISSEMINATION EVENTS

Date	Channel	Event	Place/ Country	Partner responsible	Nature and size of audience
1st of February	Meeting	Concertation Workshop of IST Projects	Lucerne Switzerland	UNICAL	Coordinators of related EU Projects, about 15 people
23/24 February 2006	Regional Press Local TV Web-sites	Kick-Off Meeting	Cosenza ITALY	UNICAL	General Public Size of audience cannot be determined
27 March 2006	Meeting	Polish Cardiac Society	POLAND	JUMC	Physicians ,members of Polish Cardiac Society in Krakow, about 100 people
June 7th 2006	Conference	International Council for Medical Care and Compunetics (ICMCC)	The Hague /Netherlands	VMWS/ UNICAL	Physicians, doctors, computer scientists , experts in medical domain, 50 attendants
June 29-30 2006	Conference	Information Communication Technologies (ICT) for Bio-medical sciences 2006	Brussels / Belgium	UNICAL	Project coordinators, professionals related to EU projects 200 attendants
July 10-20th 2006	Workshop	Mathematics and Medical Diagnosis	Erice /Italy	UNICAL	Mathematicians and experts in machine learning 50 attendants
July 13th 2006	Workshop	"Mass-Data Analysis of Images and Signals"	Leipzig/ Germany	CNR	Computer scientists, physicists, mathematicians and engineers 40 attendants
Sep 06	Conference	Computers in Cardiology	Valencia/ Spain	FORTH	250 ; physicians engineers, physicists, biologists and computer scientists
23 October 2006	Meeting	Polish Cardiac Society	POLAND	JUMC	Physicians, members of Polish Cardiac Society in Krakow, about 100 people
Oct 06	Workshop	Marie Curie Workshop Zagreb & Belgrade Celebrating Nikola Tesla	Zagreb/Croatia Belgrade, Serbia	RBI	~ 100 researchers and students from technical domains and natural science domains

Oct 06	Symposium	Meeting on BioInformatics and Medical Informatics organized by the Academy of Athens, Foundation for Biomedical Research	Athens, Greece	FORTH	80; engineers, biologists, computer scientists and other scientists in the fields of bioinformatics and medical informatics.
Oct 06	Conference	The International Special Topic Conference on Information Technology in Biomedicine (ITAB 2006)	Ioannina, Greece	FORTH	150 ; physicians, engineers, physicists, biologists, computer scientists and others scientists.
Oct 06	Conference	Mednet 2006 11th Conf. on Internet in Medicine	Toronto, Canada	CNR	Internationally known leaders in e-Health. 500 attendants from 43 countries

	Paper Publication	IEEE Transactions on Biomedical Engineering		FORTH	Web-link: http://ieeexplore.ieee.org/iel5/10/26767/01011090TBME2007890741.pdf?tp=&arnumber=1011090TBME2007890741&isnumber=26767
Nov 06	On-line publication			CNR	http://www.ilcittadinoonline.it/L5.cfm?Id=2071
Jan 07	Abstract submission			UNICZ UNIMB JUMC AUXOL UNICAL	Submission to HEART FAILURE 2007
Jan 07	Paper submission	PAKDD 2007 AIME 2007		RBI	
Feb 07	Networking	Personal Health Systems event		UNICAL FORTHNET FORTH	

Table 1: Deliverables List

Del. N.	Deliverable Name	Work Package	Due Date	Delivery Date	Lead Contractor
D1	Project Presentation	WP 0	Month 1	28/04/2006	UNICAL
D2	Project handbook	WP 0	Month 3	15/06/2006	UNICAL
D3	Report on Qualità Assurance Process	WP 0	Month 3	15/06/2006	UNICAL
D4	1st Quarterly Report	WP0	Month 3	15/06/2006	UNICAL
D5	Medical-clinical processes and requirements in HF domain and formulation of the decision making problems	WP 1	Month 5	08/08/2006	UNICZ
D6	Early plan for Using and Disseminatine knowledge	WP 8	Month 6	15/09/2007	UNICAL
D7	2nd Quarterly Report	WP 0	Month 6	14/11/2006	UNICAL
D8	Definition and formulation of the organization and management models for healthcare delivery	WP 1	Month 8	14/11/2006	UNICZ
D9	Specifications of all biomedical data, signs and symptoms relevant to the HF	WP 2	Month 8	14/11/2006	VMWS
D10	3rd Quarterly Report	WP 0	Month 9	15/12/2006	UNICAL
D11	Functional Specifications of the Middleware	WP 3	Month 10	22/01/2007	SYNAP
D12	1st Report on the distribution of the Community Contribution among contractors	WP 0	Month 12	09/03/2007	UNICAL
D13	1st Periodic Report (activity and management)	WP 0	Month 12	09/03/2007	UNICAL
D14	Specifications of Data Acquisition and Transmission Infrastructure	WP 2	Month 12	09/03/2007	VMWS
D15	Functional Specifications of data processing and decision support services	WP 5	Month 12	09/03/2007	CNR
D16	First Report on Dissemination Activities	WP 8	Month 12	12/03/2007	UNICAL
D17	4th Quarterly Report	WP 0	Month 12	09/03/2007	UNICAL

Table 2: Milestones List

Milestone N.	Milestone Name	Work Package	Due Date	Delivery Date	Lead Contractor
MS 0.1	1st Periodic Report	WP 0	1/2/2007	13/03/2007	UNICAL
MS 1.1	Identification of medical clinical requirements	WP 1	1/7/2006	08/08/2006	UNICZ
MS 1.2	Definition of new models for healthcare delivery	WP 1	1/10/2006	14/11/2006	UNICZ
MS 2.1	Functional specifications of the data Acquisition	WP 2	1/2/2007	13/03/2007	VMWS
MS 3.1	Functional Specifications of the Middleware	WP 3	1/2/2007	01/02/2007	SYNAPSIS
MS 8.1	Dissemination Plan	WP 8	1/8/2006	15/09/2006	UNICAL

Section 3 – Consortium Management

WP0 – PROJECT MANAGEMENT

WORK PACKAGE: 0			
TITLE: MANAGEMENT			
START DATE: MONTH 1			
WORK PACKAGE LEADER:UNICAL (4MMs)			
PARTNERS INVOLVED:UNICZ (1MM), UNIMIB (1MM), VMWS (1MM),FORTHNET (0,5MM), SYNAPSIS (1MM), CNR(1MM),RBI (0,5MM)			
MEETINGS	PLACE	DATE	ATTENDANTS
Kick Off Meeting	Cosenza	23/02/06	All Consortium
Via e-mail with the coordinator		07/04/06	All Consortium
STAB and MB Meeting	Crete	9-12/7/ 06	All Consortium
UNICAL/UNICZ	Catanzaro	19/07/ 06	UNICAL/UNICZ
MB & STAB Meeting	Pisa	7-10/11/06	All Consortium
IST Coordinators Day on Project Management	Brussels	28 /11/06	UNICAL
WP 0 Meeting	Pisa	23/01/07	UNICAL/CNR/SYNAPSIS

OBJECTIVES AND ACHIEVEMENTS OF THE TASKS DUE IN THE PERIOD

TASKS AND OBJECTIVES	ACHIEVEMENTS	ACTIVITIES
T 0.1 Overall management of the Consortium	Good interaction and coordination among all the partners.	Thanks to the excellent cooperation given by each partner, including the ones who have no man month allocation for this WP, UNICAL settled a Consortium network that will meet project requirements and no delay are foreseen at this stage of the project. The task has been carried out guarantying communication of management information to the Consortium, collection of management reports and feedbacks from all partners. The task has been carried out virtually (mainly through e-mails) and non-virtually, through direct phone calls and meetings, ensuring a punctual answer to internal management questions and issues. Thanks to a strong cooperation and contribution of the entire Consortium through WP leaders, it has been possible to forward the due documents on time, except for a slight delay in D1 and D11. Preparation for the reporting period in terms of practical aspects, collection of contribution, financial information for the 1st periodic management report, filtering information between the Consortium and the Commission Project meetings and internal WP0 meetings: the face to face interaction has been a key point of management during this first year, in order to clarify key issues and collect suggestions and feedbacks from all partners, whereas a joint coordination with hosting partners for

		MB & STAB meetings has been established.
T 0.2 Co-ordination of the Consortium Activities	Definition of the coordination strategies within each WP and interaction between WP leaders and coordinator.	The task has included the co-organisation of the steering meeting and the collection of all reports. During MB and STAB meeting in Crete, all WPs have been further defined and more technical details have been approved by the Consortium. The task has been carried out with similar tools and especially detailed during meetings and all issues followed by the Co-ordinator. Under this respect a stronger coordination of the technical and scientific activities within each WP has been achieved. In fact, the coordination of the scientific and technical activities has been further consolidated, by the definition and tuning of the procedures for the effective collaboration among the several partners involved within each WP. In particular, each WP Leader is responsible to: • plan and organise the overall internal work; • coordinate the contribution from the relevant partners; • define the roadmap for the development of the deliverables; • collect feedbacks from the WP group as far as Quarterly Reports are concerned. Permanent communication with the Consortium for all enquiries and information Commission and Consortium related. Evaluation of possible co-operation with other projects and programmes . Overall management of Deliverables of all WPs, collection of all related material with the contribution of all WPs and of the entire Consortium. Partecipation to the IST Coordinators day on project management. Contribution to the booklet of the ICT for Health Unit's report on ehealth activities financed under the 6th Framework Programme.
T 0.3 Management of contractual, legal, financial and administrative procedure of the consortium,		The task has been ensured and, when necessary, provided information to the Consortium while an internal 6 moths cost statement has been collected. The activities of this task became more intense towards the first reporting period. Amendment for clause 9.2: after a favourable opinion from Commission Project Officer and the agreement of Heartfaid Consortium, an amendment request for Article 9.2 of the contract to remove the clause of non-prefinancing for the contractor Synapsis, has been sent on October 30th to the Commission. Collection of 6 months internal cost statement: as stated in Heartfaid Consortium Agreement the coordinator has collected the above mentioned form from each contractor to monitor the expenses from the start of the project Finally, each partner has been responsible for all other direct issues with the coordination unit within the deadlines.
T 0.4 Internal	Development of	The communication infrastructure for supporting the

Communication infrastructure	the Project web Site	overall project management has been established by the improvement and extension of the services and functionalities provided by the project web site. The internal communication infrastructure has been realized by the services and functionalities provided by the Internal side of the Project Web Site. Further support has been realized by audio conference services.

LIST OF WP0 DELIVERABLES AND MILESTONES OF THE PERIOD

DELIVERABLE	DUE DATE	COMMENTS
D1 Project Presentation	Month 1	Completed with a short delay
D2 Project Handbook	Month 3	Completed in line with Annex I
D3 Report on Quality Assurance Process	Month 3	Completed in line with Annex I
D4 1st Quarterly Managerial Report	Month 3	Completed in line with Annex I
D7 2nd Quarterly Managerial Report	Month 6	Completed in line with Annex I
D 10 3rd Quarterly Managerial Report	Month 9	Completed in line with Annex I
D 12 1ST Periodic Report on the distribution of the Community contribution among contractors	Month 12	Completed in line with Annex I
D13 1st Periodic Report (activity and management)	Month 12	Completed in line with Annex I
D 17 4th Quarterly Managerial report	Month 12	Completed in line with Annex I
MILESTONE	DATE	COMMENTS
MS 0.1 - 1ST PERIODIC REPORT	Month 12	With deliverable D13 of this periodic report details have been defined and reported .

General Comments

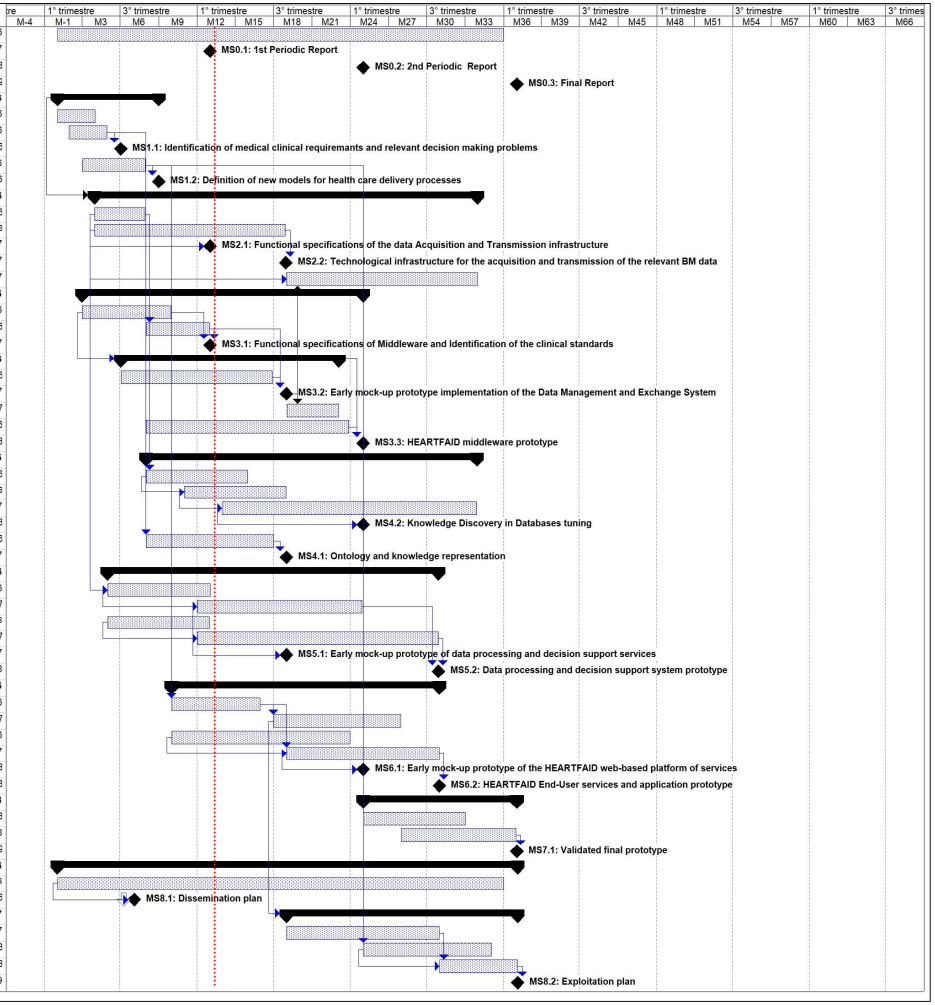
Management activities for the period reported have concentrated on the tasks above mentioned in order to ensure the smooth running of the project.
Through the collection of information and feedbacks from each partner and each work package, UNICAL has been able to send due reports to the Commission.

Future meetings

MEETINGS	PLACE	DATE	ATTENDANTS
WP 0 Meeting	Brussels	12/2/ 07	UNICAL/FORTHNET
WP 0 Meeting	Milan	19/02/ 07	UNICAL/UNIMIB/AUXOL
MB & STAB Meeting	Milan	20-21/02/07	Hosting:UNIMIB/AUXOL Attendants MB & STAB
Revision Meeting	Brussels	27-28/03/07	Coordinator:UNICAL Attendants:MB & STAB

PROJECT BARCHART AND STATUS

ID	Nome attività	Durata	Inizio
1	**WP0:Management**	764 g	mer 01/02/06
2	MS0.1: 1st Periodic Report	0 g	gio 01/02/07
3	MS0.2: 2nd Periodic Report	0 g	ven 01/02/08
4	MS0.3: Final Report	0 g	lun 02/02/09
5	**WP1: HEART FAILURE DOMAIN ANALYSIS**	**173 g**	**gio 02/02/06**
6	T1.1 - SoA analysis of the medical and clinical processes in the domain	65 g	gio 02/02/06
7	T1.2 - Problem statement and formulation of the relevant Decision Making problems	66 g	mer 01/03/06
8	MS1.1: Identification of medical clinical requirements and relevant decision making p	0 g	lun 03/07/06
9	T1.3 - Organization and management models for the Healthcare delivery	109 g	sab 01/04/06
10	MS1.2: Definition of new models for health care delivery processes	0 g	dom 01/10/06
11	**WP2: BIOMEDICAL DATA IDENTIFICATION AND COLLECTION**	**656 g**	**lun 01/05/06**
12	T2.1 - Identification of all BM, signs and symptoms relevant to the hearth failure path	87 g	lun 01/05/06
13	T2.2 Design and development of the data Acquisition and Transmission infrastructu	327 g	lun 01/06/06
14	MS2.1: Functional specifications of the data Acquisition and Transmission infrastructu	0 g	gio 01/02/07
15	MS2.2: Technological infrastructure for the acquisition and transmission of the releva	0 g	mer 01/08/07
16	T2.3 - Data Collection	327 g	gio 02/08/07
17	**WP3: MIDDLEWARE, INTEROPERABILITY AND INTEGRATION**	**481 g**	**sab 01/04/06**
18	T3.1 - Middleware requirements and functional specifications	153 g	sab 01/04/06
19	T3.2 - Identification of the clinical standards for representation and communication of	109 g	ven 01/09/06
20	MS3.1: Functional specifications of Middleware and Identification of the clinical stand	0 g	gio 01/02/07
21	**T3.3 - Integration Middleware**	**373 g**	**lun 03/07/06**
22	T3.3.1 - Early mock-up prototype implementation of the Data Management and I	261 g	lun 03/07/06
23	MS3.2: Early mock-up prototype implementation of the Data Management and E	0 g	gio 02/08/07
24	T3.3.2 - Prototype refinement	88 g	ven 03/08/07
25	T3.4 - Interoperability Middleware	347 g	ven 01/09/06
26	MS3.3: HEARTFAID middleware prototype	0 g	ven 01/02/08
27	**WP4: KNOWLEDGE REPRESENTATION, DISCOVERY AND MANAGEMENT**	**566 g**	**ven 01/09/06**
28	T4.1 - Implementation of a suitable data warehouse for knowledge discovery	174 g	ven 01/09/06
29	T4.2 Data understanding and preparation	174 g	ven 01/12/06
30	T4.3 - Implementation of Knowledge Discovery in Databases processes	436 g	gio 01/03/07
31	MS4.2: Knowledge Discovery in Databases tuning	0 g	ven 01/02/08
32	T4.4 - Ontologies and medical knowledge representation in the domain	218 g	ven 01/09/06
33	MS4.1: Ontology and knowledge representation	0 g	gio 02/08/07
34	**WP5: DATA PROCESSING AND DECISION SUPPORT SERVICES**	**566 g**	**gio 01/06/06**
35	T5.1 - Identification of representation features for signals and images processing	176 g	gio 01/06/06
36	T5.2 - Design and development of models and methods for signals and images proce	282 g	lun 01/01/07
37	T5.3 Requirements and functional specification of the Decision Support System	174 g	gio 01/06/06
38	T5.4 - Implementation of the Decision Support System	413 g	lun 01/01/07
39	MS5.1: Early mock-up prototype of data processing and decision support services	0 g	gio 02/08/07
40	MS5.2: Data processing and decision support system prototype	0 g	mar 29/07/08
41	**WP6: END-USERS APPLICATIONS AND SERVICES**	**458 g**	**mer 01/11/06**
42	T6.1 - Design of the End-User Services Interaction functionalities	152 g	mer 01/11/06
43	T6.2 - Development of End-User applications and services	220 g	lun 02/07/07
44	T6.3 - Knowledge discovery system for web-based data extraction and analysis	304 g	mer 01/11/06
45	T6.4 Integration of Services	262 g	gio 02/08/07
46	MS6.1: Early mock-up prototype of the HEARTFAID web-based platform of services	0 g	ven 01/02/08
47	MS6.2: HEARTFAID End-User services and application prototype	0 g	ven 01/08/08
48	**WP7: TESTING AND VALIDATION**	**262 g**	**ven 01/02/08**
49	T7.1 - Deployment of the prototypes in suitable clinical settings	175 g	ven 01/02/08
50	T7.2 - Clinical validation	197 g	gio 01/05/08
51	MS7.1: Validated final prototype	0 g	lun 02/02/09
52	**WP8: DISSEMINATION AND EXPLOITATION**	**788 g**	**mer 01/02/06**
53	T8.1 Dissemination activities	766 g	mer 01/02/06
54	MS8.1: Dissemination plan	0 g	ven 04/08/06
55	**T8.2 - Exploitation activities**	**395 g**	**gio 02/08/07**
56	T8.2.1 - Investigation of new models for Heathcare Processes	262 g	gio 02/08/07
57	T8.2.2 - Cost/Benefits analysis	220 g	ven 01/02/08
58	T8.2.3 - Exploitation plan	133 g	ven 01/08/08
59	MS8.2: Exploitation plan	0 g	mar 03/02/09



PERIODIC MANAGEMENT REPORT

Section 1 - Justification of Major Cost Items and Resources

UNICAL

UNICAL Costs (for the first year)

	EU contribution	UNICAL contribution
Personnel	**57700,00 (26 MM)**	**46940,00 (10 MM)**
Equipment	**2488,91**	**7000,00**
Travelling	**15541,26**	**1400,00**
Other costs	**4087.67**	**0**
Indirect costs	**15963,56**	**0**
TOTAL	**€ 95781,40**	**€ 55340,00**

UNICAL personnel by work-package

WP's	**EU Contribution**	**UNICAL Contribution**
WP0	4	3
WP1	7	2.5
WP2	1	0.5
WP4	6	1
WP5	7	2
WP8	1	1
TOTAL	**26**	**10**

Work performed in the first 12 months on WP0, WP1, WP2, WP4, WP5 and WP8

WP0

WP0 leader. Overall coordination of the Consortium, in terms of scientific, technical and management activities. Performing of all the management activities related to the contractual, legal, financial and administrative procedures of the Consortium. Coordination and management of the internal communication activities. Development, publication and submission of all the management deliverables. Organization of the Kick Off meeting and of three Steering Meetings (MB and STAB meetings).

WP1

Collaboration with the clinical partners for the development of Deliverables D5 and D8. In particular, a strong cooperation has been realized with the clinical partners for the systematic analysis and description of the Heart Failure medical-clinical domain. Moreover, our contribution has been relevant for the identification and formalization of the medical decision making problems relevant for the management of the HF patients. Finally, as far as the development of D8 is

concerned, we devised and defined news approaches on the basis of which it is possible to implement new Heart Failure management care programs.

WP2

We contribute in the identification and definition of the biomedical data, signs and symptoms relevant to the Heart Failure.

WP4

We contributed in the analysis and evaluation of the available methodologies and technologies for the definition of ontologies and medical domain knowledge representation. We further contributed in devising suitable approaches for the definition and design of effective data warehouse for knowledge discovery procedures. Moreover, we started activity on the definition and evaluation of available methodologies for data preparation, especially in terms of features selection procedures. Finally, we started, in cooperation with UNICZ, the analysis and definition of the knowledge discovery methodologies more suitable, effective and efficient for the formalization and solution of the medical decision problem related to the early diagnosis of the decompensation conditions.

WP5

A rather effective and strong cooperation has been realized with CNR and SYNAP in order to identify the requirements and the functional specifications of the Decision Support System (DSS). In particular, a contribution has been given in the deep analysis of the most updated state of the art about DSS and more specifically about Clinical DSS (CDSS). Moreover, a specific contribution has been given for the formulation and definition of the requirements of CDSS relevant to the HF domain.

WP8

WP8 leader. The dissemination activities of the first reporting period have been mainly carried out on the basis of: internal dissemination of the Heartfaid project, by seminars to PhD students and organization of specific lessons within Master degree courses; participation to national and international conferences; submission and publication of scientific and technical papers to peer review international journals; participation to clustering and concertation activities organized by EU; design, development and upgrading of the project web site.

Explanatory note on major costs

Major costs have been for personnel costs and travelling. Direct Costs refer to:

- Personnel costs for additional supporting of research and technological development innovation activities and consortium management activities. They concern about the establishment of 8 contracts for 8 external personnel contribution (26 MM), with a total gross amount of Euro 57700,00.

- Travelling costs for the participation of internal and external personnel to the Steering Meetings of the project, to specific technical and management meetings with other partners, to national and international conferences and workshops related to the activities of the project, to the participation of clustering and concertation meetings organized by EU. The total amount is Euro 15541,26.

The contribution of UNICAL to the project in this first year was the following:

- The internal personnel contributed of total 10 MM: 7 MM of associate professors, 1 MM of assistant professor, 1 MM administrative director and 1 MM administrative secretary.
- Travelling costs for the participation to the 2° Steering Meeting in Pisa (IT).
- Partial usage of already available equipments: 4 Personal Computers, 2 Laser Printer, 1 Video Projector.

Deviations from the cost budget and from person-month budget
No deviations.

Workpackage progress
Completely in line with Annex I.

UNICZ

UNICZ Costs (for the first year)

	EU contribution	UNICZ contribution
Personnel	**14.387,00 (19,5 MM)**	**68.000,00 (12 MM)**
Equipment	**0**	**70.000,00**
Travelling	**1.462,01**	**742,68**
Indirect costs	**3.169,80**	**0**
TOTAL	**€19.018,80**	**€ 138.742,68**

UNICZ personnel by work-package

WP's	EU Contribution	UNICZ Contribution
WP0	1	2
WP1	13	6
WP2	3	2
WP5	2	1
WP8	0,5	1
TOTAL	**19,5**	**12**

Work performed in the first 12 months on WP1, WP2, WP5 and WP8

During the first year the work has been concentrated on heart failure domain analysis (WP1) and on the biomedical data identification and collection (WP2), and we have collaborated, in part, with identification of representation features for signals and images processing (WP5) and in the dissemination activity (WP8).

In particular, the major work has been based on the heart failure domain analysis. Our activity related to task 1.1 has been characterized by the analysis of the medical and clinical processes in the heart failure domain. The work has been structured on a deep analysis of the of the medical and clinical procedures of the relevant domain, from the study of the guidelines and protocols for the evaluation and clinical management of HF patients, and from the relevant results of the evidence based medicine in HF domain. So we have defined the specific identification, formulation and assessment of all the requirements relevant to the HF domain. This activity has allowed to develop the Task 1.2 (Problem statement and formulation of the relevant decision making problems). This task has been based on the analysis performed in the previous task. Our aim was to identify the overall functionalities and services provided by the HEARTFAID platform, in this task we have defined the decision making problems that the several health care operators, involved in the clinical management of HF patients, must face and solve in an effective and efficient way. The developing of T 1.1 and T 1.2 have allowed to define and formulate the deliverable D5: Medical-clinical processes and requirements in HF domain and formulation of the decision making problems. Within month six, we have completed the state of the art analysis and the problem statement, as well as the user requirements. This activity has included an official milestone "MS1.1: Identification of medical clinical requirements and relevant decision making problems" that has been achieved with D5.

Subsequently, the Task 1.3 has been developed. Our activity has concerned the devising and development of new organization and management models, on the

basis of which define more effective and efficient heart failure care programs. These models are related to the organization of the care programs on a given territory, the coordination and collaboration of all the health care operators involved (practitioners, professional nurses, hospital physicians, geriatrics, cardiologists), the integration of health care environments (home, primary ambulatory, territorial ambulatory, hospital). The work for T1.3 has allowed to define Deliverable D8: Definition and formulation of the organization and management models for the healthcare delivery .

About the biomedical data identification and collection we have worked to identify all the biomedical data, signs and symptoms relevant to heart failure (HF) with the aim to establish the presence and the aetiology of the condition; to choice the management for the condition; to evaluate tolerability, effectiveness and compliance to treatment; to evaluate the prognosis of the disease; and to acquire novel information concerning the condition for. research and development, (Task 2.1, Deliverable D9).

About the identification of representation features for signals and images processing (Task 5.1): we have collaborate with the other partners for a correct identification and understanding of features extracted from signals and images for a possible analysis. For the images we have concentrated ourself on echocardiography. This activity could be of great support for the identification of suitable mathematical models for the specific clinical problem in the cardiovascular field, and for the possible quality assessment of the data acquired by the devices.

About the dissemination we have utilized also the web-site of UNICZ for the knowledge project diffusion. Moreover we have submitted a paper to Heart Failure European Congress 2007 and the project has been presented to the Study Group of Myocardial Function, Cardiomyopathies and Cardiac Insufficiency of the Italian Society of Cardiology for its dissemination. Now we are preparing a paper for the Italian Society of Internal Medicine National Meeting 2007 and for the Italian Society of Cardiology National Meeting 2007 for the advancements of the project.

Explanatory note on major costs

Major costs have been for travelling and personnel costs.

Direct Costs refer to research and technological development innovation (see section A, form C) and they concern about:

1) a contract for one person responsible for office activity for supporting WP1 activity (€ 3.137,00)
2) a contract for one specialized doctor involved in WP1 and WP2 activity (€ 11.250,00 until January 31-2007)
3) travelling costs for the following Heartfaid Meetings, we have travelled only to project meetings and always with only one staff member:
    - Crete Meeting on July 9-12, 2006 (€ 794,01)
    - Pisa Meeting on November 7-10, 2006 (€ 668,00)

The contribution of UNICZ to the project in this first year was the following:

1) travelling costs for Krakow meeting on April 9, 2006 (€ 742,68) (Heartfaid fund was not yet available for the internal administrative procedures of UNICZ);
2) three permanent fixed position doctors, two have cooperated for five man/months each (one full professor and one assistant professor) and one for two man/months (one executive physician), with a total contribution of € 68.000,00;

3) partial usage of: two desktop PCs with printers, two portable PCs, Electrocardiographs, M-mode and two-dimensional sonographer, consumables € 70.000,00.

All the costs are completely in line with Annex I, except the UNICZ contribution for the travelling.

Deviations from the cost budget and from person-month budget

No deviations.

Workpackage progress

Completely in line with Annex I.

UNIMIB

UNIMIB Costs (for the first year)

	EU contribution	UNIMIB contribution
Personnel	**0**	**45.135,52 (10 MM)**
Equipment	**0**	**20.000,00**
Travelling	**1664,51**	**0**
Indirect costs	**332,90**	**0**
TOTAL	**€1997,41**	**€ 65.135,52**

UNIMIB personnel by work-package

WP's	**EU Contribution**	**UNIMIB Contribution**
WP0	0	1
WP1	0	5
WP2	0	3
WP6	0	1
TOTAL	**0**	**10**

Work performed in the first 12 months on WP1 and WP2.

WP1. UNIMIB was involved with UNICAL, UNICZ, JUMC and AUXOL in T1.1 and T1.2 of the Work Package WP1 with the goals of describing in a systematic fashion the heart failure medical domain and of highlighting some of the most crucial decision making problems encountered by the medical personnel involved in the care of patients with chronic heart failure (CHF).

In detail, in order to develop specific functionalities of the HEARTFAID platform (HFP) tailored on the heart failure medical domain, an up to date description of the heart failure etiology, pathophysiology, clinical presentation, as well as diagnostic and prognostic assessment has been made. A particular attention has been paid to identify the main services and functions that each of the users (the patients and their relatives, the medical personnel) may be in need of in each of their respective environments.

In line with the most recent recommendations of the European Society of Cardiology (ESC), (*European Heart Journal 2005; 26:1115-1140; European Heart Journal 2005; 26:384-416*) some key procedures that the HFP may help with have been identified. They pertain to the d*iagnosis* of CHF, to the clinical *standard management* as well as to the *prognosis* assessment. An additionally functionality dealing with research and development has been conceived.

All of the potential settings of operation of the HFP have been thoroughly studied coming to the conclusion that the HFP could be a valuable support to the above procedures in a variety of environments ranging from the *non specialized medical environment*, i.e. the office of the general practitioner, to the *specialized hospital*, to the *patient's own environment*, i.e. the patient's home, to the medical and technological *research environment*.

In order to specifically tailor some of the functional specifications of the HFP, the most relevant decision making problems that are daily faced by the medical personnel (and some of them by the patients) as relevant to the procedures of diagnosis, management, prognosis assessment and research have been itemized. The decision making problems that could be supported in some respect by the HFP can be summarized, although the list is not exhaustive, as: increasing the number of correct (positive or negative) diagnosis by decreasing both the number of falsely negative and falsely positive diagnosis; helping with the diagnosis of heart failure with preserved left ventricular ejection fraction; finding the single biomedical parameter or the combination of parameters (among signs, symptoms, and test results) that best identify subjects affected by heart failure; increasing the diagnostic accuracy of heart failure by setting new cutoffs and/or new reference values for individual or combinations of parameters; improving the diagnostic capability of low resource medical settings; allowing to implement a form of remote consultation; supporting the complex task of classification of CHF severity; based on disease severity, suggesting the best applying pharmacological and non pharmacological measures for each individual patient; support some measures to verify that guidelines on CHF management are implemented in order to have an impact on medical outcomes and the health care costs; offering the CHF patients more efficient means for monitoring and may help identifying the single parameter or the combination of parameters, their cutoffs and/or reference values, that best defines subjects'conditions (stable, improving, rapidly worsening, or slowly worsening); identifying the single biomedical parameter or the combination of parameters, with relative cutoffs, with predicting value for heart failure with reduced or preserved ejection fraction; for each of the conditions among stable, improving, rapidly or slowly worsening; for each severity NYHA class; on large random patient samples followed over time may help determining the prognostic impact of numerous and unselected variables undergoing repeated determination and whether the adherence to guidelines improve the quality of clinical practice and the utilization of health care resources; improving the compliance to the prescribed regimen if implemented in patients' homes by providing informative material, reminders on medications' and measurements' schedule; allowing to monitor at home some relevant symptoms and biomedical parameter with the goals of performing the most appropriate management changes in a timely fashion, and identify the predictors of CHF decompensation.

Possible health care models of application for the HFP have been detailed in T1.3.

En effort has been made in WP2, T2.1, to identify the biomedical data, signs and symptoms relevant to heart failure, functionally clustered as relevant for diagnostic, therapeutic and prognostic implications in the various settings. Furthermore, a list of biomedical sensors for acquisition and transmission of various parameters to the HFP have been listed.

Explanatory note on major costs:
In this first part of the project the costs have been mainly related to traveling and intellectual contribution by researchers, aimed at preparing the deliverables planned in this period.
We have made use in this part of the project only of own staff personnel.
AC Own staff UNIMIB contribution
Prof. G. Parati c/m eur 5.213,54* 5= 26.067,70 eur
Dott. A. Saino c/m eur 3.990,16*2= 7980,32
Dott. M. Bombelli c/m eur 4.166,83*2=8.333,70
Dott.ssa C. Cherubini c/m eur 2.753,80*1= 2.753,80
Total eur **45.135,52**
Equipment UNIMIB Ctb
Eur 20.000,00 for usage of computer systems developed for remote monitoring of heart failure patients and for testing the suitability of a number of biomedical signals for the project. This has included use of device for nocturnal polysomnography
Travelling
Heartfaid meeting to Creta 08/07/06-12/0706
invoice n. 193/ter of 08/07/06 L'Orchidea viaggi srl+ invoice n. EC4493 of 31/07/06 L'Orchidea viaggi srl eur **1.220,21**
Heartfaid meeting Pisa 07-09/11/06 eur **224,30** to prof. Gianfranco Parati and invoice n. 908 of 10/11/06 L'orchidea viaggi srl eur **220,00.**
Overheads
20**%** to 1.664,51

Deviations from the cost budget and from person-month budget
We needed 3 months for WP2 because of the work necessary to identify the biomedical data relevant to heart failure to be considered for HEARTFAID. This time was also necessary to identify and check the sensors suitable for biomedical data collection in the frame of HEARTFAID.

Workpackage progress
In line with the scientific progress, although the work was carried out by own staff. This is because hiring of external people is planned for the subsequent years. An additional exception being the extra amount of work requested to complete WP2.

JUMC

JUMC costs- for the first year

	EU contribution	JUMC contribution
Personnel	**22368,92 (15,5 MM)**	**5200,00 (4 MM)**
Equipment	**6449,16**	**8.000**
Travelling	**6207,95**	**0**
Consumables	**429,86**	**0**
Indirect costs	**7091,18**	**0**
TOTAL	**€42547,06**	**€ 13200,00**

JUMC personnel by work-package

WP's	EU Contribution	JUMC Contribution
WP0	0	0
WP1	11	3
WP2	3	1
WP6	1	-
WP8	0.5	-
TOTAL	**15.5**	**4**

Work performed in the first 12 months on WP1, WP2, WP6, WP8

During the first year JUMC has participated in the following HEARTFAID WP:

- WP 1 Heart Failure Domain Analysis
- WP 2 Biomedical data collection and identification
- WP 6 End users applications and services
- WP 8 Dissemination and exploitation

JUMC as one of the four clinical Partners of the Project aimed at giving a complete and detailed description of the whole medical knowledge related to heart failure, in order give an input support for technological Partners to develop Heart Failure Platform (HFP).

Starting from a deep analysis of the medical and clinical procedures of the relevant domain, from the study of the guidelines and protocols for the evaluation and clinical management of HF patients, and from the relevant results of the evidence based medicine in HF domain, we have identified, formulated and assessed the most important information relevant to the HF domain in **WP1**. Main services and functions of the HFP have been articulated based on the typical workflows followed by subjects with either suspected or proven chronic heart failure (CHF) (described in Deliverable 5).

In **WP2** we have worked on a proper identification of all signs, symptoms and biomedical data which could be of potential importance in chronic CHF diagnosis, management, prognosis and research development in a manner to be used later in HFP construction. The summary of all kind of biomedical data which could have a potential influence on the CHF management collected through various medical environments was provided in deliverable D9 prepared jointly by WP2 Partners. In order to define the set of sensors which will be integrated into HFP, we have

collaborated with VMWS and other techological Partners on a questionnaire related to the characteristics of each of the JUMC available sensors.
Based on the recent ESC Guidelines, current knowledge and our clinical experience in collaboration with other clinical partners we have prepared also a Case Report Form (CRF) which contains in a time sequence all biomedical information relevant to CHF patients and will be collected in further part of the project. The biomedical information contains the data concerning patients history, data from physical examination, results of additional tests (echocardiography, 24-h ECG monitoring, laboratory test, chest X-ray, cardiopulmonary exercise tests, quality of life) and for some cases tests important for further research development (continuous blood-pressure monitoring). The CRF was circulated and agreed between all clinical and technological HEARTFAID Partners providing a support for currently ongoing **WP6**.
As an additional contribution to HEARTFAID project, involving an internal cooperation with JUMC Department of Bioinformatics and Telemedicine, we have created an electronic version of CRF based on Spring Framework Technology. It will serve as a temporary tool for data collection of CHF patients being useful both for clinical partners (data collection, HFP testing and validation, research activities) and for technological partners (helpful for HFP data mining-related work and further HFP development) and may subsequently be replaced by HFP front-end application provided by technological Partners.
During the first year of the project JUMC has contributed to the dissemination of HEARTFAID (**WP8**) through presenting its design and preliminary experience at several scientific meetings:

- at the scientific meetings of the Krakow Division of Polish Cardiac Society
- at the meeting for the Department staff serving as an update on ongoing research activities of the Department and progress in cardiovascular science scientific news and on)

We also organized two HEARTFAID meetings in Cracow 31.01-2.02.2006 and 8-9.04.2006 mostly to discuss the clinical issues related to the project.
The information on HEARTFAID was placed on the web pages of the I Cardiac Department at JUMC (http://www.kardiologia1.cm-uj.krakow.pl/) and official JUMC www.cm-uj.krakow.pl websites as dissemination knowledge channel.

Explanatory note on major costs
Major costs have been personnel costs, equipment and travel costs.
We have spent about 22.000 EUR for *personnel* working on the project. With this money we paid for 26 MM (12.5 MM for 3 scientific researchers, and 3.0 MM of technical personnel). Moreover as JUMC contribution we have spent 4.0 MM for 2 academic researchers and 1 person working as technical staff.
It was completely in line with planned budget as stated in the DoW in Annex I for the first year.
We have spent about 6.000 EUR for *equipment*. We have purchased three portable PCs, (including software) which are currently used for the project purposes and were very useful in described above JUMC activity in the project. The remaining sum we have spend on the continuous blood pressure monitoring system which, as stated above, will be utilized for development of the HFP research level. The purchase of the remaining part of the system will be finalized at the beginning of

March 2007 due to the long and complicated procedures related to international purchase in terms of Public Procurement Law. JUMC contribution for equipment used for the project purposes was 8000,00 EUR according to monthly exploitation charge estimated for the first year of the project at 666,66 EUR per month.
We have spent about 6.000 EUR for *traveling*. We have traveled only to project-related meetings (Cosenza, Milan, Heraklion, and Pisa). The following staff members have participated: Prof. K. Kawecka-Jaszcz, K. Styczkiewicz MD, B.Bacior MD.

Deviations from the cost budget and from person-month budget
The internal budget has been slightly modified, by shifting some amount from personnel to consumables and travelling costs, of course without any changes in the total amount of the main categories: RTD, Management, Demonstration activities.

Workpackage progress
Completely in line with Annex I.

VMWS

VMWS costs for the first year

RTD (including Indirect Costs)	**199664,41 (26,45MM)**
Management (including indirect costs)	**6528,00 (0.91 MM)**
TOTAL	**€206192,41**
Requested Contribution	**€ 106360,21**

VMWS personnel by work-package

WP's	
WP0	0,91
WP2	18,13
WP3	8,32
TOTAL	**27,36**

Work performed in the first 12 months on WP0, WP2 and WP3

WP0

- Coordination of activities
- Preparation of reports
- WP2 leader

WP2: VMWS participated in T2.1 and T2.2 and performed the following activities:

- Collaboration with the clinical partners towards the definition of the biomedical signs and symptoms relevant to heart failure pathology.
- Participation the survey towards the definition of possible sensors to be integrated in HEARTFAID.
- Definition of the requirements and specifications of the Data Acquisition and Transmission Infrastructure.
- Definition of the interfaces between the Data Acquisition and Transmission infrastructure and the HEARTFAID platform.
- Development and standalone testing of software modules that handle Bluetooth communication with sensors in J2ME programming environment.
- Contribution to the definition of the set of sensors by creating an electronic questionnaire related to sensors characteristics and distributing it to the clinical partners.
- Development of data transmission modules in Java programming environment and testing of the interface to the HEARTFAID platform vie the transmission of dummy data.

WP3: VMWS participated in T3.2 and T3.3 and performed the following activities:

- Contribution in the survey of clinical standards for representation and communication of data
- Definition in collaboration with SYNAPSIS of the XML messaging format for the transmission of biomedical data to the HEARTFAID platform
- Participation to the definition of the functional requirements of the HEARTFAID middleware from the aspect of integrating data coming from various sensors into the HEARTFAID platform.

Explanatory note on major costs

Travel Costs

- Project meetings:
  - Kick-off meeting in Cosenza (2 persons),
  - STAB meetings in Heraklion and Pisa (1 person)
- Attendance at IEEE EMBC'06
- Numerous technical meetings with Forthnet in the scope of WP2

Total travelling costs:9,200,00 Euros

Deviations from the cost budget and from person-month budget

No deviations.

Workpackage progress

Completely in line with Annex I.

FORTHNET

RTD (including Indirect Costs)	**€ 264.025,20 (36,1 MM)**
Requested Contribution	**€ 132.012,60**

CATEGORY	PAID	OWN	TOTAL
PERSONNEL	71,529.34	71,529.34	143,058.68
EQUIPMENT	0.00	0.00	0.00
TRAVEL	2,875.28	2,875.28	5,750.57
OTHER	384.51	384.51	769.01
INDIRECT	57,223.47	57,223.47	114,446.94
TOTAL	**132,012,60 EUR**	**132,012,60 EUR**	**264,025.20 EUR**

WP's	PAID PM's	OWN PM's	TOTAL
WP0	0.5	0.0	0.5
WP2	7.3	7.3	14.6
WP3	9.0	9.0	18
WP6	1.5	1.5	3
TOTAL	**18.3**	**17.8**	**36.1**

Work performed in the first 12 months on WP0, WP2, WP3 and WP6

The activity regarding the definitions and specifications of the data acquisition and transmission infrastructure, in work package 2, was carried out jointly with VMWS and Synapsis and was based on the health monitoring environments that have been identified (hospital, home and outdoors). In Deliverable 14 there is an extensive description and analysis for the "InHome" environment, stating the methods that are going to be used for the most suitable implementation, regarding the acquisition and transmission of the sensors' data.

The "End User Application and Services" work package features implementation-oriented activities and customization of advanced and well established technologies. Risk issues are considered an important aspect of this WP and are basically related to the proper definition of end-user requirements and the design of effective and user-friendly interfaces and functionalities.

The "end-user" level constitutes the front-end layer of the HEARTFAID platform and provides the means for every interaction between external users and the system. In particular, the main goal of the Task 6.1 which has started in M10, is to design and implement an interface with the dual purpose of facilitating access to the functionalities of the platform and to manage the know-how that is formalized in the platform's database.

The HEARTFAID middleware platform supports a multitude of functions to assist data entry and retrieval, and intelligent deduction. It is evident that for these functions to be adequately exploited, an intuitive and stable UI should be developed.

In Deliverable 11 there is an extensive description of the end-users applications and services.

Up to M12, most of the important functionalities of the middleware, as well as the respective Front-End interfaces have been identified. Since the development of the

Front-End has just started, the finalization of its requirements will take place in the next months.

Explanatory note on major costs

We have spent 5,750.57 EUR for *traveling*. This cost covered the travel expenses for the participation of two staff members (Manolis Stratakis and Stelios Louloudakis) in two project meetings (Cosenza and Pisa)

We have spent 769.01 EUR for *Other costs*. This cost covered part of the hosting expenses during the project meeting in Heraklion Crete.

Deviations from the cost budget and from person-month budget

There is a significant deviation between the planned and actual Person-Months due to the use of lower –than originally planned- staff costs. Almost from the beginning of the project it was decided that it will be better -for the efficiency of the project work- to assign numerically more personnel (B class Engineers) rather than few A class Engineers, without compromising the quality of the work. Also, it is worth to mention that the relative increase of the actual PM's will not affect the overall agreed personnel budget which is available for our institution.

Workpackage progress

Completely in line with Annex I.

SYNAPSIS

SYNAPSIS costs for the first year

RTD (including Indirect Costs)	**161.946,01 (24,10 MM)**
Management (including indirect costs)	**4.808,76 (0,1 MM)**
total	**€ 166.754,77**
Requested Contribution	**€ 85.781,77**

SYNAPSIS personnel by work-package

WP's	
WP0	0,10
WP2	3,00
WP3	16,00
WP4	0,80
WP5	2,00
WP6	2,30
TOTAL	**24,20**

Work performed in the first 12 months on WP0, WP2, WP3, WP4, WP5 and WP6.

WP0

- Coordination of activities
- Preparation of reports
- WP3 leader

WP2: SYNAPSIS participated in TASK T2.2 and performed the following activities:

- Collaboration with the clinical partners towards the definition of the HF Electronic Patient Record (EPR).
- Study and identification of a suitable Electronic Medical Record (EMR) to be adapted to the HF needs.
- Implementation of a first EMR mock-up.
- Definition of the requirements and the functional specifications that the HF EPR should provide.
- Definition of a preliminary roadmap to transform the available general purpose EMR into the HF EPR.

WP3: SYNAPSIS participated in tasks T3.1, T3.3 and T3.4 and performed the following activities:

- Definition of the functional specification and the requirements of the HEARTFAID middleware.
- Contribution in the analysis of the available standards for data representation and communication.

- Coordination of the preparation of Deliverable D11.
- Definition of the XML messaging format for the transmission of biomedical data to the HEARTFAID platform.
- Study and identification of the most suitable technologies for the implementation of the Integration Middleware.
- Implementation of an early mock-up prototype of the Data Management and Exchange System.

WP4: SYNAPSIS participated in task T4.4 and performed the following activities:

- Contribution in the study of available technologies for the definition of ontologies and domain knowledge representation.

WP5: SYNAPSIS participated in task T5.3 and performed the following activities:

- Cooperation with CNR in order to identify the requirements and the functional specifications of the Decision Support System.

WP6: SYNAPSIS participated mainly in task T6.1 and performed the following activities:

- Cooperation with FORTHNET for the definition of the End-User Services functionalities.

Explanatory note on major costs

Travel Costs

- Project meetings:
  - Kick-off meeting in Cosenza (3 persons),
  - STAB meeting in Heraklion (1 person)
  - GENERAL ASSEMBLY meeting in Pisa (4 persons)
- Technical meetings with CNR in the scope of WP3

Total travelling costs: 2.398,32 Euros

Other Costs

- Contribution in the preparation of the Steering Meeting held in Pisa on November 2006

Total other costs: 3.470,00 Euros

Deviations from the cost budget and from person-month budget

The major deviations from the planned costs are related to personnel expenditure. In particular, the amount of person months spent in the first year is lower than the amount foreseen at the beginning of the project, that is a total of 24,20 instead of 31. The lower expenditure involved mainly the workpackages WP0 and WP5.
As far the other cost categories are concerned, there was a relative lower expenditure also for consumable, travel and equipment.

Workpackage progress
Completely in line with Annex I. Only a small delay in the issue of the deliverable D11.

CNR

CNR costs for the first year

RTD (including Indirect Costs)	**188.377,17 (24,96MM)**
Management (including indirect costs)	**7.492,78 (1 MM)**
total	**€ 195.869,95**
Requested Contribution	**€ 101.681,37**

CNR personnel by work-package

WP's	
WP0	1
WP3	3
WP4	3
WP5	18.46
WP8	0.5
TOTAL	**25,96**

Work performed in the first 12 months on WP3, WP4, WP5 and WP8

- **WP3 (T3.3, 2 P/M and T3.4, 1 P/M)**

The work concerned the issues related to Tasks 3.3 and 3.4 (Middleware integration and interoperability) relevant for designing the Clinical Decision Support System component (CDSS) of HEARTFAID.
The Middleware requirements were defined with regards to the interaction and the communication of the DSS with the other platform components, and to the format of the data for their processing.
In particular, it was formalized that the CDSS is a process that is not continuously running but it is activated on demand. Thus, we thought to consider a manager of all the events occurring in the platform, not coincident with the CDSS, able to organize and assign their management. To this purpose, we investigated those aspects inherent to the capability of extending the middleware by introducing a workflow management system able to capture audit data useful for obtaining statistics and providing information on all the running processes.
Considering the interactions and the data flows occurring among the CDSS and the other HEARTFAID components, we pointed out that each component should include a manager able to transform information between a request and a response.

- **WP4 (3 P/M)**

The activity was focused on the main aspects concerning ontologies and medical knowledge representation in the domain (Task 4.4).
Several knowledge representation *formalisms* were investigated, evaluating their expressivity and tractability, namely rule-based, frame-based, logic-based,

network-based, workflow, and ontology-based representations. A structured integration between ontologies and rules turned out as the most appropriate solution, for both domain description and medical knowledge modelling.
The importance and benefits of standardization, in terms of knowledge reuse and easier sharing across platforms and settings, suggested selecting and extending one of the well-established medical ontologies. UMLS, MeSH, SNOMED, HL7 RIM are examples of the ontologies considered for assessing their consistency, completeness, and free-of-charge availability.
Moreover, the advantages of dividing a global ontology into several sub-ontologies (SO) were also debated, in order to improve performances and reduce the complexity of the overall management. Main SOs should represent the main application scenarios of the HEARTFAID platform, namely diagnosis, prognosis and therapy planning, monitoring and data processing.
Finally, for further improving the quality of the ontologies, a different level structure, from general to specific concepts, was evaluated, together with the introduction of typed information.

- **WP5** the activities focused on two main topics, namely:
  - Data processing (Task 5.1, 5.2);
  - Decision Support Services (Task 5.3).

First, we analyzed in detail the activities required by the tasks and their interplays with the other workpackages, in order to obtain an effective schedule. In particular, a strict interaction with task T2.1 was considered important and then implemented to set up the work related to signals and images processing.
About *Data Processing*, a state of the art was carried out regarding the representation and the characterisation of the relevant features extracted from signals and images, both in their general properties and in the specific cardiovascular field under investigation.
Preliminarily, it was necessary to acquire a schematic though precise knowledge of the medical domain. With this goal in mind, a careful examination of the deliverable D5, the guidelines by the ESC and ACA/AHA and of related literature cited therein was performed.
In this way, it was possible to draft the lists of both the diagnostic devices and the representation features relevant for the various levels of the HEARTFAID platform. Some of the considered features had a precise mathematical foundation, while other ones seemed to be only of a qualitative nature.
Besides, two main aspects when interpreting cardiologic signals and images were considered: open problems assessment and correlation analysis and signal/image categorization. The first one, referred to intra/inter-observer variability, was studied to reduce instrumentation lacks and analysis subjectivity. The latter instead aimed at extending the HEARTFAID knowledge through developing new methods for extracting *innovative representing features.*
Once identified the classical cardiac parameters which are more prone to intra- and inter- observer variability, we studied and developed an algorithm for left ventricle end-systolic and end-diastolic volume quantification in ultrasound images. During the last month, a testing activity started on left ventricle segmentation from echocardiographic image sequences (4 and 2 chambers apical views and short axis mid-papillary) (Task 5.2).

In relation to innovative representing features, we started developing and testing tools for the analysis and fast visualization of segmental timing mechanics. This way, we intend to assess the cardiac dyssynchrony in heart failure patients and to foresee the outcome of cardiac resynchronization therapy. Our goal was also to extract innovative representing features to improve analysis by adding input data to the HEARTFAID CDSS, useful to categorize the left ventricle deformation pattern.
As a further topic, we planned to address the problem of detection, treatment and interpolation of ectopic beats to achieve accurate estimations of heart rate variability (HRV).
The work related to *Decision Support Services* started with a deep investigation of the methodological foundations of Decision Support Systems (DSS), both in organizational and clinical applications. In so doing, the general requirements and functionalities of a DSS were listed up. Particular attention was reserved to knowledge based clinical systems, and guidelines modelling approaches.
In order to map the studied methodologies into the HEARTFAID domain, we firstly analyzed the platform as a complex clinical information management system, able to offer a number of services for optimizing the daily clinical practice. In this perspective, the HEARTFAID *cycle* was outlined as consisting in *measurements*, *analysis*, *decisions* and *actions* phases.
Once the several services to be supplied were carefully investigated, three main contexts were identified, i.e. data collection and management, knowledge-based decision support and end-user applications, assigning them some of the platform functionalities. Then, we focused on the knowledge-based decision support context, i.e. the HEARTFAID CDSS. An accurate investigation was then performed concerning (i) the medical-clinical requirements and the relevant decision making problems formulated in the deliverable D5, (ii) the users' scenarios, and (iii) the project requirements. This led to the definition of the overall characteristics of the HEARTFAID CDSS.

- **WP8 Dissemination (0.5 P/M)**

A paper, titled "*Collaborative Virtual Working Environments for Medical Expertise Sharing*" was presented at 11th World Congress on Internet in Medicine Mednet 2006, October 14-19, 2006, Toronto (Canada).
The preliminary results of image processing were reported in a paper accepted at the 2nd International Conference on Computer Vision Theory and Application, held in Barcelona, 8-11 March 2007, and in papers submitted to the 15th European Signal Processing Conference, EUSIPCO 2007 and Mass Data Analysis Workshop 2007.

Explanatory note on major costs
Total Person Month: 24,96 RTD + 1 MGM (25,96 TOT)
Personnel Costs: 193.926,65 (included Overhead)
Major Costs: Travel 1.943,30 (Cosenza Feb 2006, Heraklion July 2006)

Deviations from the cost budget and from person-month budget
With respect to the planned 25,5 PM (24,5 RTD + 1 MGM), we increased of 0.5 our total effort in Year I. This slight deviation was due to some experimental work

done on DSS that was necessary to check the applicability of some functional specifications.

Workpackage progress
Completely in line with Annex I.

FORTH

FORTH costs for the first year

RTD (including Indirect Costs)	**105621,82(10,98MM)**
Requested Contribution	**€ 52810,91**

WP's	
WP2	1 – planned 0
WP3	4.5- planned 6
WP4	3- planned 3
WP5	2-planned 5
WP8	0.48-planned 0.5
TOTAL	**10.98**

FORTH costs (for the first year)

	Total cost
Personnel	45895.92 (planned 47850)
Traveling	5768.62
Other costs	718.01
Indirect costs	53239.27 (planned 57420)
Total	105621.82 EUR

Work performed in the first 12 months on WP2, WP3, WP4, WP5, WP8

The work has been concentrated around the following topics: medical device integration, interoperability and standards for interoperability, data security, state of the art of ontology and terminology in the domain, and data processing.

The major work was performed in several directions:

1) In WP2 due to the delay in the selection of the devices that will be used and integrated in the platform, we offered our support to the WP leader for cooperating in the evaluation of the existing devices at the validation sites that the clinical partners desired to integrate in the platform. This inventory has almost been completed and each device has been analyzed in its capability of transmitting the acquired data to a host and in its semantic interoperability. Depending from these features, different kind of integrations have been decided for the devices and different processing (WP5) will be performed. We suggested the WP leader reporting the result of the inventory in the first deliverable scheduled for WP2.
2) In WP3, in order to better clarify the operative scenarios of the HEARTFAID platform, in agreement and cooperation with the WP leader we described different operative scenarios in an easy language neither technically nor clinically biased. Thus, an additional document "The HEARTFID scenarios" was prepared and discussed among partners. Part of this document has been useful also in the activities of the other WPs. Furthermore, the state of the art of the most common standards for clinical data encoding and communication was studied and examined. In particular, the data exchange among the sub-systems of

the platform has been investigated and the solutions of HL7 and HL7 Clinical Document Architecture (CDA) were recommended specially for the exchange of clinical documents such as discharge summaries and progress notes. These standards are recommended for the information exchange among subsystems of the platform and between the platform and any clinical third-party system. Furthermore, the standards related to the information exchange between medical devices and the HEARTFAID platform were studied and examined. Dividing the world of medical devices between imaging and non-imaging medical devices, the adoption of DICOM for imaging medical devices was recommended, while various different standards were identified for non-imaging medical devices. Considering the high cost in terms of time or money for the implementation of proprietary protocols for communication/data format with medical devices that do not implement any information exchange standard, integration of such devices in the HEARTFAID platform was discouraged and was recommended to be evaluated on a case-by-case base. Additional work was performed in the study of the state of the art for the security, safety and privacy issues. The results of the work performed about clinical standards and security have been included in deliverable D11 (first deliverable of WP3).

3) In WP4 FORTH has been involved in the study of the state of the art of the main existing ontologies, terminologies and databases (OTD) for the medical domain and for the heart failure domain. The results of this study were presented at the steering meeting in Pisa. The recommended approach was to select some main existing ontologies (free-of-charge included the tools for their management) and starting from them inserting wherever they do not exist yet the necessary specific classes for the heart failure domain as emerged from the deliverables resulted from WP1 for the diagnosis, prognosis and management of the heart failure patients. FORTH has cooperated with the partners in tasks T4.4, as discussed with the WP leader, mainly with a consulting role in the attempt of merging the defined ontology with middleware ontologies (HL7 RIM).
4) In WP5 FORTH has been involved in the analysis of the representation features for the signals acquired by the medical sensors (non-imaging devices) identified in WP2 and WP1. For each type of medical sensor candidate to be used in the HEARTFAID platform, the relevant features (parameters) have been identified. Still an evaluation of the capability of such sensors to transfer information (in a structured format or as raw data) to the HEARTFAID platform is not available. In order to cope with this problem amplified by the lack of communication/data format standards present in the medical devices used in the validation sites, some multipurpose basic algorithms have been identified. The results of this first analysis with the work-in-progress information available about the medical devices have been reported in deliverable D15. FORTH has also started the work on the design of algorithms for ECG filtering, QRS detection and QRS classification that are basic algorithm for any ECG, Holter ECG or HRV processing and analysis.
5) In WP8 FORTH has inserted information about the HEARTFAID project on its internal web site. FORTH has presented the paper “Support for the Medical-Clinical Management of Heart Failure within Elderly Population: the HEARTFAID Platform” at ITAB 2006 international conference in Ioannina, Greece and published the paper “Non-Invasive ECG as a Tool for Predicting Termination of Paroxysmal Atrial Fibrillation” in the IEEE Transactions on

Biomedical Engineering (accepted for publicatiuon). FORTH has furthermore operated dissemination at the "Computers in Cardiology 2006" conference in Valencia, Spain, at the "ESBME 2006" congress in Patras, Greece and at the "Meeting on BioInformatics and Medical Informatics" in Athens organized by the Academy of Athens, Foundation for Biomedical Research.

Explanatory note on major costs

Major costs have been travel and personnel costs.

FORTH has spent about 5800 EUR for *traveling*. We have traveled to project meetings (Cosenza and Pisa) and at the kick-off meeting we participated with one staff member (Chiarugi). While at the meeting in Pisa we participated with 2 people (Manganas, Chiarugi). We have also traveled to international conferences for dissemination purposes (CinC 2006 and ESBME 2006). In both events FORTH's participants was Franco Chiarugi.

FORTH has spent about 720 EUR for *other costs*. In this item we included all costs afforded for the organization of the second steering meeting that was held in July in Heraklion, Crete, Greece.

FORTH has spent about 46000 EUR for *personnel*. With this money we paid about 11 men/months mainly of high-profile people for the reasons explained in the "Deviations from the cost budget and from person-month budget".

Deviations from the cost budget and from person-month budget

The most significant deviation is a little lower number of engaged person-months (about 11 instead of planned 14.5) but with out increase in respect to cost budget. The main reasons are a little delay in the outcomes of WP2 and the difficulties in receiving satisfactory information about the devices. For this reason we finally decided to offer a contribution to WP2 and to use more high profile resources in order to try to overcome the existing difficulties. In terms of personnel cost the total amount is absolutely comparable with the estimation made in the DoW. However it is expected that the less person-month spent in WP5 will be totally recovered during the second year of the project having completely clear the full characteristics of the raw data acquired by the integrated medical devices.

Workpackage progress

The work performed for the WPs has been completely in line with DoW. The most significant deviation is the contribution offered to WP2 in order to analyze the integrability of the devices currently in use in the validation sites (and consequently estimate the possible data processing). The integrability will be performed on a best effort base.

RBI

RBI costs (for the first year)

	EU contribution	RBI contribution
Personnel	**21.717,06 (21 MM)**	**20905,98 (11.5 MM)**
Equipment	**24.597,44**	**6209,98**
Travelling	**9.979,40**	**0**
Other Costs	**1.420,89**	**0**
Indirect costs	**11.506,56**	**0**
total	**€69.039,35**	**€ 27.115,36**

RBI personnel by work-package

WP's	**EU Contribution**	**RBI Contribution**
WP0	0	2
WP4	18-planned 8	8.5
WP6	2	0
WP8	1.5	1
TOTAL	**21.5-planned 11**	**11.5**

Work performed in the first 12 months on WP4, WP6 and WP8

The work has been concentrated around three topics: knowledge representation, knowledge discovery, and data warehousing.

The major work was in the *knowledge representation* part. It is an important issue for the platform because it practically determines intelligent behavior of the final product. Knowledge should be effectively used by the decision support subsystem and besides the quality of the knowledge relevant is also the form in which the knowledge is represented. For the representation of concepts most appropriate are ontologies. We have used Protégé frames and OWL formalisms to develop a large ontology describing heart failure domain. This ontology is now on the web on our local heartfaid site so that it can be discussed and improved in collaboration with other project partners (http://lis.irb.hr/heartfaid/ontology/). In this way a large part of the work related to T4.4 has been already done. But early in our work we have identified the problem of the collection and representation of the operational medical knowledge. Although not explicitly stated in the DoW, availability of such knowledge could be essential for the platform usability. The problem is that representation and decision support based on operational knowledge is in principle a difficult and an unsolved problem in spite of significant effort already invested in its solution. Practically from the very beginning of the project, even before the official start of WP4 we have began to study knowledge representation standards for medical guidelines, looking not only for most appropriate knowledge representations forms but testing also different decision support tools that could be used for these representation forms. The research in this field is very relevant also outside the frames of this project, and any advancement in this respect would be relevant for the field of medical informatics in general. Besides testing Jess rules and SWRL rules that can nicely integrate with ontologies, we

have experimentally used also Arden syntax and GLIF. The generally detected problem is that approaches that are powerful in representing medical procedural knowledge are missing tools that implement decision support functionality (e.g. GLIF) while approaches that have such tools are missing some of necessary language expressivity (e.g. negations are missing in OWL+SWRL setting). As potentially appropriate solution seems at the moment combination of ontology representation + Jess rules + Jess reasoner. We have developed an experimental setting which successfully combines transformation of patient factual knowledge from a simulated Hearfaid patient record database into ontological form that can be used for decision support based on Jess rules and OWL ontology of heart failure concepts. This experiment, and description of a systematic approach to ontology construction in medical domains have been prepared in the form in two papers for conferences in year 2007.

Knowledge discovery is the field of our long-term work and in respect to the project we have devoted special attention to the methodology which is able to present relevant relations in the human understandable form. This is relevant for both tasks T4.3 and T6.3. In this respect specially interesting seems the methodology of contrast sets. Additionally, we are developing methods for systematic detection of supporting and coexisting factors that significantly help in user acceptance of induced models. Specifically in respect to Heartfaid project it seems relevant that these supporting and coexisting factors can be used inside knowledge representation in order to improve the quality and reliability of the decision support process.

Up to now there have not been any platform related data. That is the reason that available historical data about brain stroke patients have been used to test the novel methodology. The same datasets have been used to test available data preparation and data cleansing methodology (T4.2). Recent results in this field have been prepared in the form of two conference papers, one of which is already accepted for the presentation on the PAKDD 2007 conference.

Data warehousing (T4.1) concentrated on two subtasks. The first is identification of data that will be available inside the platform and that will be used for knowledge discovery and decision support purposes. We have implemented an experimental simulation of the database with relevant patient data that will be used for the development of data warehousing and knowledge discovery tasks. Additionally, we have constructed the ontology describing the input patient data that will be the starting point for formal definition of data warehousing transformations. The second subtask is search for historical data describing heart failure patients. Up to now we have identified four related datasets coming from UNICZ and we have started to transform the data to the form appropriate for knowledge discovery. The historical data will be used also to recognize relevant dimensions for the data visualization.

Dissemination We have participated in one bilateral Workshop presenting the core of WP4. Besides that we have one accepted paper on the PAKDD 2007 conference in respect to knowledge discovery, two submitted papers to local Croatian IT conferences describing ontology design lessons learnt, and one paper submitted to the AIME2007 conference about machine learning application. Now we are preparing a paper for MEDICON 2007.

Explanatory note on major costs

Major costs have been equipment, travel and personnel costs.

We have spent about 25.000 EUR for *equipment*. For about 20.000 EUR we have purchased a cluster of five workstations, three printers and one network switch. The cluster has two tasks. Each of the workstations is now used by people working on the project as personal computers and at the same time they are integrated into a local network so that distributed computational intensive tasks can be executed faster. In the future in a distributed platform concept the cluster can be used also as a central node for knowledge modules that will be accessed via internet by different decision support clients. For about 5.000 EUR we purchased a workstation and two thin clients. The workstation servers as internet server and central data storage for WP4, while clients are used for demonstration purposes. All the purchased equipment is in everyday use for the execution of project tasks including software development, internet access, reporting, and web services.

We have spent about 10.000 EUR for *traveling*. We have traveled only to project meetings (Cosenza, Heraklion, and Pisa) and at each meeting we participated with three staff members (Gamberger, Smuc, Malenica, Prcela).

We have spent about 22.000 EUR for personnel. With this money we paid for 21 men/months (16.5 MM of two PhD students and 4.5 MM of technical personnel). According to the DoW in Annex I it was planned that in the first year we will use only 11 MM. This significant increase is the consequence of two factors: a) we started to work on WP4 immediately in month 1 although according to plans we were assumed to start in month 7. The reason is that the problem of selection of most appropriate combination of knowledge representation formalism and decision support tool was immediately detected as very difficult and time consuming. b) We could get only PhD students without previous experience so that their months income is relative low but they need longer time to produce requested results. So in spite of significant MM increase we are completely in accordance with planned budget and we will not decrease planned workload in future years.

Deviations from the cost budget and from person-month budget

The most significant deviation is the increased number of engaged person-months (21 instead of planned 11) but without increase in respect to cost budget. The main reasons are difficult tasks to solve in WP4 in respect to knowledge representation and acquisition, and engaged personel with low cost (unexperienced PhD students). It can be noted that own RBI contribution in person-months has been also significant and larger than planned.

Workpackage progress

Completely in line with Annex I. The most significant deviation is the large amount of work invested in finding optimal form for the presentation of medical knowledge and collection of actual medical knowledge related to the heart failure domain.

AUXOL

AUXOL costs (for the first year)

	EU Contribution	AUXOL Contribution
Personnel	13.500,00	44.000,00
Equipment	1.391,00	75.000,00
Travelling	4.595,00	
Consumables	0	
Other Specific Costs	0	
Mangement	0	
Indirect Costs	3.897,20	
TOTAL	**23.383,20**	**119.000,00**

AUXOL personnel by work-package

WP's	**EU Contribution**	**AUXOL Contribution**
WP1	6	2
WP2	3	2
TOTAL	**9**	**4**

Work performed in the first 12 months on WP1 and WP2

In T1.1 and T1.2 of the Work Package WP1, prepared together with UNICAL, UNICZ, JUMC and UNIMIB and UNIMIB, we intended to summarize the most relevant

aspects of the heart failure medical domain and identify main decision making problems faced by health care operators involved in the management of heart failure patients.

In particular, the current evidence on etiology, pathophysiology, clinical manifestations and most up to date diagnostic and prognostic strategies have been described in a systematic way in an attempt to help the technical partners of this project to design the general functional architecture of the HEARTFAID platform as specifically tailored on the heart failure domain. Additionally, an effort has been made to identify the main services and functions that each of the users of the platform may take advantage of while acting in his/her respective environment. In particular, such services have been thought to support subjects with suspected or known chronic heart failure (CHF), the medical personnel involved in their management, as well as to patients' relatives involved in their care.

From the functional standpoint, the crucial procedures that the platform could significantly support while adhering to the most recent European Society of Cardiology (ESC) Guidelines (*European Heart Journal 2005; 26:1115-1140; European Heart Journal 2005; 26:384-416*), have been narrowed to those related to the d*iagnosis* of CHF, to the clinical *standard management* as well as to the *prognosis* assessment of the condition. As the diagnostic, prognostic and therapeutic options are constantly and rapidly evolving in the domain of heart failure, a specific functionality of the platform dealing with research and

development has been conceived. This should allow, while supporting the standard management of heart failure, to collect and elaborate data with the goal of expanding the existing knowledge on this condition. Furthermore, an effort has been made on identifying the settings specifically encountered by patients with CHF where the platform could operate. They range from the *non specialized medical environment*, i.e. the office of the general practitioner, to the *specialized hospital*, to the *patient's own environment*, i.e. the patient's home, to the medical and technological *research environment*.

A number of problems, some of them unresolved, are faced on a daily basis by patients with CHF and by their health care operators. In order to properly shape some of the functional specifications of the platform, we tried to list them as relevant to the procedures of diagnosis, management, prognosis assessment and research. Overall, the platform may:

- increase the number of correct (positive or negative) diagnosis by decreasing both the number of falsely negative and falsely positive diagnosis;
- help with the diagnosis of heart failure with preserved left ventricular ejection fraction;
- support finding the single biomedical parameter or the combination of parameters (among signs, symptoms, and test results) that best identify subjects affected by heart failure;
- increase the diagnostic accuracy of heart failure by setting new cutoffs and/or new reference values for individual or combinations of parameters;
- improve the diagnostic capability of low resource medical settings;
- allow to implement a form of remote consultation;
- support with the complex task of classification of CHF severity;
- based on disease severity, help suggesting the best applying pharmacological and non pharmacological measures best applying to each individual patient;
- support some measures to verify that guidelines on CHF management are implemented in order to have an impact on medical outcomes and the health care costs;
- help in offering the CHF patients more efficient means for monitoring and may help identifying the single parameter or the combination of parameters, their cutoffs and/or reference values, that best defines subjects'conditions (stable, improving, rapidly worsening, or slowly worsening);
- identifying the single biomedical parameter or the combination of parameters, with relative cutoffs, with predicting value for heart failure with reduced or preserved ejection fraction; for each of the conditions among stable, improving, rapidly or slowly worsening; for each severity NYHA class;
- on large random patient samples followed over time may help determining the prognostic impact of numerous and unselected variables undergoing repeated determination and whether the adherence to guidelines improve the quality of clinical practice and the utilization of health care resources;
- improve the compliance to the prescribed regimen if implemented in patients' homes by providing informative material, reminders on medications' and measurements' schedule;
- allow to monitor at home some relevant symptoms and biomedical parameter with the goals of performing the most appropriate management changes in a timely fashion, and identify the predictors of CHF decompensation.

In T1.3 an analysis on available and potential health care models for heart failure, potentially applicable to the use of the platform, has been attempted.
In WP2, T2.1., the biomedical data, signs and symptoms relevant to heart failure grouped as relevant to establishing the diagnosis, the aetiology, the best management and the prognostic implications of the condition have been identified. Additionally, a set of biomedical sensors that can potentially be connected to the platform for data acquisition (blood pressure, heart rate, arterial blood oxygen saturation, ECG, ect) in our setting (in hospital and out of hospital) have been identified.

Explanatory note on major costs
Major costs have been personnel, equipment, and traveling.

1. 13.500,00 EUR for a research grant (a junior cardiologist), largely involved in the research activities listed above.
2. 1.391,00 EUR: correspondent to the first year percentage of the depreciation (20% of the asset value), usually applied by Istituto Auxologico Italiano. The equipments purchased are a System for Biomedical signal acquisition and a portable PC.
3. 4.595,00 EUR for traveling which served to participate to project meetings (Cosenza, Heraklion, and Pisa) and to meet with the clinical partner JUMC to write down the clinical protocols for the future field testing and validation of the platform.

Deviations from the cost budget and from person-month budget
The most significant deviation from expectations has been the increased number of engaged person-months (13 instead of 9 planned). The reason for this deviation has been the amount of time requested to complete tasks T1.1 and T1.2 of the Work Package WP1.

Workpackage progress
Completely in line with Annex 1, the only exception being the extra amount of work requested to complete WP1.

Table 3: Budget vs. Actual Costs

Cost Budget Follow-up Table					
Contract Nº:	**IST-2005-27107**	**Acronym:HEARTFAID**			
PARTICIPANTS	**TYPE of EXPENDITURE (as defined by Annex 1)**	**TOTAL BUDGET**	**ACTUAL COSTS**	**Pct. spent**	**Remaining Budget (EUR)**
			Period 1	**Total**	
		e	a1	a1/e	e-a1
UNICAL A/C	**Total Person-month**	**70**	26	37%	**44**
	Direct Costs	**251484**	79817,84	32%	**171666,16**
	Indirect costs	**49096**	15936,56	32%	**33159,44**
	Total Costs	**300580**	**95781,4**	32%	**204798,6**
UNICZ A/C	**Total Person-month**	**35**	19,5	56%	**15,5**
	Direct Costs	**105367**	15849,01	15%	**89517,99**
	Indirect costs	**20073**	3169,8	16%	**16903,2**
	Total Costs	**125440**	**19018,8**	15%	**106421,2**
UNIMIB A/C	**Total Person-month**	**24**	0	0%	**24**
	Direct Costs	**78525**	1664,51	2%	**76860,49**
	Indirect costs	**14505**	332,9	2%	**14172,1**
	Total Costs	**93030**	**1997,41**	2%	**91032,59**
JUMC A/C	**Total Person-month**	**26**	15,5	60%	**10,5**
	Direct Costs	**78337**	35455,88	45%	**42881,12**
	Indirect costs	**15267**	7091,17	46%	**8175,83**
	Total Costs	**93604**	**42547,05**	45%	**51056,95**

VMWS FCF	**Total Person-month**	**63**	27,36	43%	**35,64**
	Direct Costs	**384518**	173360,41	45%	**211157,59**
	Indirect costs	**75704**	32832	43%	**42872**
	Total Costs	**460222**	**206192,41**	45%	**254029,59**
FORTHNET FC	**Total Person-month**	**66**	36,1	55%	**29,9**
	Direct Costs	**330.714**	149578,26	45%	**181135,74**
	Indirect costs	**237600**	114.446,94	48%	**123153,06**
	Total Costs	**568.314**	**264.025,20**	46%	**304288,8**
SYNAP FCF	**Total Person-month**	**80**	24,2	30%	**55,8**
	Direct Costs	**476933,33**	138962,31	29%	**337971,02**
	Indirect costs	**94186,67**	27792,46	30%	**66394,21**
	Total Costs	**571120**	**166754,77**	29%	**404365,23**
CNR FC	**Total Person-month**	**48**	25,96	54%	**22,04**
	Direct Costs	**226200**	119.441,03	53%	**106758,97**
	Indirect costs	**165120**	76.428,92	46%	**88691,08**
	Total Costs	**391320**	**195.869,95**	50%	**195450,05**
FORTH FC	**Total Person-month**	**43**	10,98	26%	**32,02**
	Direct Costs	**160136**	52382,55	33%	**107753,45**
	Indirect costs	**170280**	53239,27	31%	**117040,73**
	Total Costs	**330416**	**105621,82**	32%	**224794,18**
RBI AC	**Total Person-month**	**46**	21,5	47%	**24,5**
	Direct Costs	**161466**	57532,79	36%	**103933,21**
	Indirect costs	**31573**	11506,56	36%	**20066,44**
	Total Costs	**193039**	**69039,35**	36%	**123999,65**
AUXOL AC	**Total Person-month**	**24**	9	38%	**15**
	Direct Costs	**78525**	19486	25%	**59039**
	Indirect costs	**14505**	3897,2	27%	**10607,8**
	Total Costs	**93030**	**23383,2**	25%	**69646,8**

TOTAL	**Total Person-month**	**525**	**216,1**	41%	**308,9**
	Direct Costs	**2332205,3**	**843530,59**	36%	**1488674,74**
	Indirect costs	**887909,67**	**346673,78**	39%	**541235,89**
	Total Costs	**3220115**	**1190231,36**	37%	**2029883,64**

Table 4: Person-Months Status Table

Person-Month Status Table

CONTRACT N°:	IST-2005-27107
ACRONYM:	HEARTFAID
PERIOD:	1/2/2006-31/1/2007

		Partner - Person-month per Workpackage												AC - own staff						
		TOTALS	UNICAL	UNICZ	UNIMIB	JUMC	VMWS	FORTHNET	SYNAP	CNR	FORTH	RBI	AUXOL	AC TOTALS	UNICAL	UNICZ	UNIMIB	JUMC	RBI	AUXOL
Workpackage 1:	Actual WP total:	37	7	13	0	11	0	0	0	0	0	0	6	19	2,5	6	5	3	0	2
Heart Failure Domain Analysis	Planned WP total:	42	7	13	5	11	0	0	0	0	0	0	6	0						
Workpackage 2:	Actual WP total:	46,73	1	3	0	3	18,13	14,6	3	0	1	0	3	8,5	0,5	2	3	1	0	2
Biomedical Data Identification and Collection	Planned WP total:	39	1	3	2	3	18	5	5	0	0	0	2	0						0
Workpackage 3:	Actual WP total:	49,82	0	0	0	0	8,32	18	16	3	4,5	0	0	0	0	0	0	0	0	0
Middleware, Interoperability and Integration	Planned WP total:	44	0	0	0	0	11	7	17	3	6	0	0	0						
Workpackage 4:	Actual WP total:	30,8	6	0	0	0	0	0	0,8	3	3	18	0	9,5	1	0	0	0	8,5	0
Knowledge Representation, Discovery and Management	Planned WP total:	21	6	0	0	0	0	0	1	3	3	8	0	0						
Workpackage 5:	Actual WP total:	31,46	7	2	0	0	0	0	2	18,46	2	0	0	3	2	1	0	0	0	0
Data Processing and Decision Support Devices	Planned WP total:	36	7	2	0	0	0	0	4	18	5	0	0	0						
Workpackage 6:	Actual WP total:	8,3	0	0	0	1	0	3	2,3	0	0	2	0	1	0	0	1	0	0	0
End-User Applications	Planned WP total:	10	0	0	1	1	0	3	3	0	0	2	0	0						
Workpackage 8:	Actual WP total:	4,48	1	0,5	0	0,5	0	0		0,5	0,48	1,5	0	3	1	1	0	0	1	0
Dissemination and Exploitation	Planned WP total:	4	1	0,5	0	0,5	0	0	0	0,5	0,5	0,5	0,5	0						
Workpackage 0:	Actual WP total:	7,51	4	1	0	0	0,91	0,5	0,1	1	0	0	0	8	3	2	1	0	2	0
Management	Planned WP total:	9,5	4	1	1	0	1	0,5	1	1	0	0	0	0						
	Actual total:	216,1	26	19,5	0	15,5	27,36	36,1	24,2	25,96	10,98	21,5	9	52	10	12	10	4	11,5	4
Total Project Person-month	Planned total:	205,5	26	19,5	9	15,5	30	15,5	31	25,5	14,5	10,5	8,5	0	0	0	0	0	0	0

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Appendix 1 – Plan for using and disseminating the knowledge

HEARTFAID is a research and development project aimed at devising, developing and validating an innovative knowledge based platform of services, able to improve early diagnosis and to make more effective the medical-clinical management of heart diseases within elderly population.
In very general terms, the project aims at a broader availability and extension of IST applications and services. In particularly, by exploiting the up-to-date scientific achievements on knowledge discovery and decision support systems, the main project goal is to develop new systems and services that are able to effectively integrate and process relevant biomedical data and information for improving medical knowledge and processes related to the clinical management of Heart Failure (HF) patients.
Moreover, according to the overall vision of the IST priority in FP6, HEARTFAID project proposal aims to contribute in developing innovative intelligent environments that enable ubiquitous, effective and efficient management of citizens' health conditions and supporting health professionals in coping with major health challenges. In particular, HEARTFAID provides healthcare professionals with access to timely relevant information at the point of need (i.e. different types of health care delivery environments), with a set of functionalities and services for acquiring up-to-date relevant medical knowledge that will provide a reliable support to healthcare professionals in their daily medical and clinical operations, enabling new ways of working as well as improved patient quality.
Under this respect, it is of strong strategic importance for HEARTFAID to devise and effectively implement exploitation and dissemination strategies, with the aim to emphasize the overall impact of the project's results.

Section 1 - Exploitable knowledge and its Use

As far as the "***using knowledge***" issues are concerned, since HEARTFAID is a project mostly implementation oriented, theoretical and methodological work will be rapidly converted to experimental and practical applications. Furthermore, the knowledge and experiences gained from practical experiments will also be used by the HEARTAFAID partners for defining the next generation of products and services in the relevant domain. More specifically, the industrial partners will develop a detailed exploitation plan in the course of the project, based on the following steps: identification of the market segments; detailed business plan; detailed identification of the potential markets and the competitive environment; assessment of benefits by end-users; establishment of a commercial agreement among partners on the joint commercialization and exploitation after project end; after project completion, development of the prototypes into industrial products.

At the end of the first year of activity (first reporting period), since the overall work has been mainly concentrated on the analysis of the medical domain and on the definition of the requirements and functional specifications of some basic

modules of the Heartfaid platform, we are not able to present, at the moment, results which could have an exploitable relevance.

Section 2 – Dissemination of knowledge

As far as the "***disseminating knowledge***" issues are concerned, it is of strong interest to the HEARTFAID project and its partners to disseminate its ideas and results to a community as wide as possible. Dissemination is an important interactive interface for the project for getting continued feedback on ideas and concept refinement.

The dissemination activities of the first reporting period of the project have been carried out according to the planning defined in the deliverable D6. In particular, the activities have been run on the basis of the following issues:

- Internal Dissemination: each partner has organised internal dissemination activities (seminars, press releases, relevant information published on the own web site), with the aim to improve the general awareness about Heartfaid within their own institutions.
- Project Web Site: the project web site has been established and is currently under revision and improvement. All public deliverables will be available on the site. Special pages are under construction and will be devoted to the dissemination of the results of the project.
- Conferences Exhibitions and Scientific Publications: as it has been reported in the next table, many partners have presented the project at European and national conferences and exhibitions. Moreover, some scientific papers have been already published or submitted to peer review journals.
- Clustering and Concertation Meetings: the coordinator partner has participated in clustering and concertation meetings organized by the Commission.
- Intermediaries: contacts have established with the following health care professional associations with the aim to keep informed about the Heartfaid activities: ANMCO (Italian Association of Hospital Cardiologists), SIC (Italian Society of Cardiology), SIMI (Italian Society of Internal Medicine).

Overview table

Date	Channel	Event	Place/ Country	Partner responsible	Nature and size of audience
1st of February	Meeting	Concertation Workshop of IST Projects	Lucerne Switzerland	UNICAL	Coordinators of related EU Projects, about 15 people
23/24 February 2006	Regional Press Local TV Web-sites	Kick-Off Meeting	Cosenza ITALY	UNICAL	General Public Size of audience cannot be determined
27 March 2006	Meeting	Polish Cardiac Society	POLAND	JUMC	Physicians ,members of Polish Cardiac Society in Krakow, about 100

					people

June 7th 2006	Conference	International Council for Medical Care and Compunetics (ICMCC)	The Hague /Netherlands	VMWS/ UNICAL	Physicians, doctors, computer scientists , experts in medical domain, 50 attendants
June 29-30 2006	Conference	Information Communication Technologies (ICT) for Bio-medical sciences 2006	Brussels / Belgium	UNICAL	Project coordinators, professionals related to EU projects 200 attendants
July 10-20th 2006	Workshop	Mathematics and Medical Diagnosis	Erice /Italy	UNICAL	Mathematicians and experts in machine learning 50 attendants
July 13th 2006	Workshop	"Mass-Data Analysis of Images and Signals"	Leipzig/ Germany	CNR	Computer scientists, physicists, mathematicians and engineers 40 attendants

Sep 06	Conference	Computers in Cardiology	Valencia/ Spain	FORTH	250 ; physicians engineers, physicists, biologists and computer scientists
23 October 2006	Meeting	Polish Cardiac Society	POLAND	JUMC	Physicians, members of Polish Cardiac Society in Krakow, about 100 people
Oct 06	Workshop	Marie Curie Workshop Zagreb & Belgrade Celebrating Nikola Tesla	Zagreb/Croatia Belgrade, Serbia	RBI	~ 100 researchers and students from technical domains and natural science domains
Oct 06	Symposium	Meeting on BioInformatics and Medical Informatics organized by the Academy of Athens, Foundation for Biomedical Research	Athens, Greece	FORTH	80; engineers, biologists, computer scientists and other scientists in the fields of bioinformatics and medical informatics .

Oct 06	Conference	The International Special Topic Conference on Information Technology in Biomedicine (ITAB 2006)	Ioannina, Greece	FORTH	150 ; physicians, engineers, physicists, biologists, computer scientists and others scientists.
Oct 06	Conference	Mednet 2006 11th Conf. on Internet in Medicine	Toronto, Canada	CNR	Internationally known leaders in e-Health. 500 attendants from 43 countries

	Paper Publication	IEEE Transactions on Biomedical Engineering		FORTH	Web-link: http://ieeexplore.ieee.org/iel5/10/26767/01011090TBME2007890741.pdf?tp=&arnumber=1011090TBME2007890741&isnumber=26767
Nov 06	On-line publication			CNR	http://www.ilcittadinoonggi.it/L5.cfm?Id=2071
Jan 07	Abstract submission			UNICZ UNIMB JUMC AUXOL UNICAL	Submission to HEART FAILURE 2007
Jan 07	Paper submission	PAKDD 2007 AIME 2007		RBI	
Feb 07	Networking	Personal Health Systems event		UNICAL FORTHNET FORTH	
2007 May 22	Conference	Research	**Inter. Pacific-Asia**	*~400*	*RBI + Nada Lavrac (STAB sc. advisor)*