HEARTFAID

D34 ó 9th Quarterly Managerial Report

(MB and STAB meeting minutes)
Submission date: 23/06/08
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**Information Society
and Media**

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 ó 2005 ó 027107
Duration of the Project:	01/02/2006 ó 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)

D34 ó 9th Quarterly Managerial Report
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HEARTFAID

Document summary	
Document Title:	9th Quarterly Managerial Report
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Short Description
This document describes the activities of the Consortium during the 9th quarterly of HEARTFAID project and its future activities.

Change Record		
Version Number	Changes	Release date
1.0 2.0	First draft of the Document Final version with further contributions	29-05-2008 23-06-2008

HEARTFAID

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Executive Summary

The eight Quarterly Managerial Report describes the activities and the objectives reached by Heartfaid Consortium during the period February 1 - April 30, 2008.

In short the following WPs have been involved in the work:

- WP0: Management
- WP2: Biomedical Data Identification and Collection
- WP3: Middleware, Interoperability and Integration
- WP4: Knowledge, Representation, Discovery and Management
- WP5: Data processing and Decision support devices
- WP6: End-User application and Services
- WP7: Testing and validation
- WP8: Dissemination and Exploitation

In particular, the following activities have been satisfactorily carried out:
- WP0: activities related to the preparation of the Second Project Review.
- WP2: data collection on the project clinical sites.
- WP3: completion of the middleware infrastructure and integration of the projects.
- WP4: further development of the KDD activities and refinement of the Medical Knowledge Base.
- WP5: development of the CDSS prototype and further extension of the performance of Signal and Image Processing tool kits.
- WP6: further development of the End-User Web Portal and integration of services.
- WP7: preliminary activities related to the deployment of the platform services within the clinical settings.
- WP8: dissemination activities and definition of suitable exploitation strategies.

The subsequent interim period will be particularly devoted towards the organization of the next Steering Meeting in London (June 10-11, 2008), the definition of the Clinical Protocol for the testing and validation of the Heartfaid platform, the development of the related activities for the completion of Deliverables D35 (WP2), D36 (WP5), D37 (WP6), D38 (WP8).

Ongoing workpackages progress: WP0

WORK PACKAGE: 0
TITLE: MANAGEMENT
START DATE: MONTH 1
WORK PACKAGE LEADER:UNICAL
PARTNERS INVOLVED:UNICZ, UNIMIB, VMWS , FORTHNET, SYNAPSIS , CNR, RBI

STATUS OF DELIVERABLES DUE IN THIS PERIOD

DELIVERABLE	N°	DATE DUE	COMMENTS
8th Quarterly Managerial Report	D34	30/04/08	Slight Delay

STATUS OF MILESTONES DUE IN THIS PERIOD

Milestone	TITLE	COMMENTS
M.S.0.2	2nd Periodic Report	D26 sent to EU by the foreseen deadline, D26 revised in progress to be sent by the due deadline

FORECAST STATUS OF DELIVERABLES DUE IN THE NEXT 3 MONTHS

DELIVERABLE	N°	DATE DUE	COMMENTS
10th Quarterly Managerial Report	D39	31/07/08	Foreseen to be completed on time

MEETINGS OF THE PERIOD AND FORECASTED WP0- MB & STAB MEETINGS

ACTIVITY	ATTENDANTS	DATE/PLACE
MB & STAB meeting	Coordinators: UNIMIB/AUXOL Attendants: Representatives from MB & STAB	Milan 18-19 February 2008
2nd Review Meeting	Steering meeting for the organization of the review meeting	Milan, 9 -10 April 2008
2nd Review Meeting	Coordinated by: UNIMIB/AUXOL/UNICAL Attendants: Representatives of MB, and Reviewers	Milan 11 April 2008

Description of the activities

During this quarter the management of the Consortium has mainly focused on the second reporting period, second Milestone of the WP.
The deliverables produced in this quarter have been the following:
- D27: Distribution of the Community Funds (pre-financing) among the partners
- D26: Second periodic report (activity and management)
- D33: 8th Quarterly report.

Together with the submission and the technical supervision and approval of D28 (WP3), D29 (WP4), D30 (WP5) and D31(WP6).

WP0 deliverables, in particular D26, have required the active involvement of each partner and more actively of each WP leader and each partner who have strongly contributed to all managerial tasks.

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After handling the procedures related to the second periodic report, both administrative and practical, the handling of the 2nd review outcome issues and of the financial clarifications requirements are among the tasks in progress.

Following review outcome (April 17th) financial clarifications as well as a resubmission of D26 as per EU request are the main activity in progress in WP0.

The work plan does not currently foresee any deviation and still until next interim the overall management will focus on the following tasks:

T 0.1 Overall management of the Consortium
- Handling of Deliverables
- Strengthen the cooperation with the STAB
- Cooperation with VMW for next MB & STAB meeting

T 0.3: Management of contractual, legal, financial and administrative procedure of the consortium
- Handling of financial and administrative procedures of review outcome

T 0.2: Co-ordination of the Consortium technical activities
The coordination of the scientific and technical activities has been further consolidated, by a more efficient 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.
Finally, each partner will be responsible for all other direct issues with the coordination unit within the deadlines.

T 0.4: Internal Communication infrastructure
The internal communication infrastructure has been mainly realized by the extensive use of e-mails, audio conference services and the services and functionalities provided by the Internal side of the Project Web Site.

Forecasted activities

During next three months management activities will mainly focus on the coordination and the handling of financial and administrative issues that will require accurate and punctual communication with all partners involved and the Commission.

Ongoing workpackages progress: WP2

WORK PACKAGE: 2
TITLE: BIOMEDICAL DATA IDENTIFICATION AND COLLECTION
START DATE: MONTH 3
WORK PACKAGE LEADER: VMWS
PARTNERS INVOLVED: UNICAL, UNICZ, UNIMIB, JUMC , FORTHNET, SYNAP, AUXOL

STATUS OF TASKS DUE IN THIS PERIOD

TASK	TITLE	COMMENTS
T 2.3	Data Collection	The task is progressing as expected. No deviations from the work plan are noticed.

FORECAST STATUS OF TASKS DUE IN THE NEXT 3 MONTHS

TASK	N°		COMMENTS
Data Collection	T 2.3		End of task and of WP

Description of the activities

The activities in this period are related to the collection of the relevant biomedical data in all the identified environments. The activities carried out by the partners in this period are presented in the following paragraphs.

T2.3.1 Homecare Data Collection

Regarding Home monitoring environment **UNICZ** are continuing to collect, every two weeks, in a smaller group of 49 patients the following parameters: systolic blood pressure, heart rate, respiratory rate, % of body water and weight, body temperature, in order to achieve an early diagnosis of heart failure decompensation, so as indicated in Deliverable D5.

As it was agreed between clinical partners during the HEARTFAID MB & STAB Meeting in Krakow on November 8-9th 2007, **JUMC** have performed a daily collection of clinical parameters in another group of patients which might be of particular importance for CHF decompensation prediction in home setting. Every day patients were collecting in standardized manner, according to questionnaires, the data including blood pressure values, heart rate, weight, respiratory frequency, changes in CHF symptoms and treatment.

The necessary clinical data collection by **UNIMIB** and **AUXOL** for the definition of the platform services and for building the support decision engine is now completed. To this aim data obtained daily from 30 patients followed up at home through telemonitoring technologies over 12 months have been considered to develop the decision support system.

T2.3.2 Healthcare Data Collection

In this period **UNICZ** has continued to enlist patients in the HF project and a lot of clinical data have been collected. Some patients are historical patients, already followed in our heart failure ambulatory; other patients have a recent diagnosis of heart failure. When in a new patient, referred to UNICZ Cardiovascular Disease Unit, the diagnosis of heart failure is confirmed, this patient is enrolled in

Heartfaid project. The data of this population have been introduced in a database that contains all available list of biomedical signs and symptoms, list of parameters of selected tests so as: Electrocardiogram, Holter electrocardiography, Chest X-ray, Echocardiography, Clinical chemistry, and so on, that are useful for heart failure domain. All these data have been filled also in electronic CRF, both basal assessments and additional clinical visits. The clinical assessment in these patients is scheduled every one-two months and also earlier if clinical conditions are worsening. At this moment UNICZ have a database with data from 103 patients with heart failure diagnosis. In addition, they are providing the storage of digital ECG files in SCP format, at this moment they have 44 ECGs stored. Regarding the storage of echocardiography images in DICOM format, at this moment they have 32 echocardiograms stored.

JUMC according to the project schedule officially was not participating in task T2.3 of WP 2 concerning data collection. All activity was performed as JUMC internal contribution. In collaboration with other clinical and technical partners JUMC have worked collecting the biomedical data from patients with congestive heart failure (CHF) according to the electronic Case Report Form (eCRF). eCRF was developed involving an internal cooperation with JUMC Department of Bioinformatics and Telemedicine. It is serving as a tool for structured biomedical data collection from CHF patients being useful both for clinical partners (data collection, HF platform testing and validation, research activities) and for technological partners (HFP data mining-related work and further HF platform development).

The prototype of eCRF application has been deployed at a JUMC's server and is accessible for registered clinical and technical partners on the Internet. The eCRF contains the patientsø data being crucial for HF diagnosis, management, treatment and assessing the prognosis. These are including the patientsø anamnesis, physical examination of CHF patients and results of additional tests taken mostly from devices, which cannot be, in the actual hospital premises, automatically integrated with the platform. The following results of tests were collected: cardiopulmonary exercise test, echocardiography (stored also in the DICOM format), chest X-Ray, results of laboratory tests, 24 h ECG monitoring, quality of life questionnaire and for some cases tests important for further research development (continuous noninvasive blood-pressure monitoring). Up to now about 50 cases have been enrolled from JUMC site and the appropriate forms for baseline and follow-up visits for these patients have been fulfilled.

Ongoing workpackages progress: WP3

WORK PACKAGE: 3
TITLE: MIDDLEWARE,INTEROPERABILITY AND INTEGRATION
START DATE: MONTH 2
WORK PACKAGE LEADER: SYNAPSIS
PARTNERS INVOLVED: VMWS, FORTHNET, CNR, FORTH

STATUS OF TASKS DUE IN THIS PERIOD

TASK	TITLE	COMMENTS
T 3.4	Interoperability Middleware	The activities of Task T3.4, started at month M8, have been completed during the reporting period. Although from the Gantt of the Project it was expected this task to be completed within the last reporting period, the activities have been concluded with a slight delay of two months on the timetable, in order to set up ad adequate DEMO for the second year review, held in Milan on April 2008. According to the outcomes of Subtask T3.3.2, the Interoperability Middleware architecture has been definitely refined. Some troubles have been encountered while integrating the different services available from the external/pre-existing modules into the platform. These problems have successfully been overcome within the review meeting, thus achieving the expected results of openness and versatility of the platform to integrate and dialogue with new external module adopting IHE/HL7 communication standards.

STATUS OF MILESTONES DUE IN THIS PERIOD

MILESTONE	TITLE	COMMENTS
M.S.3.3	Middleware prototype	Successfully achieved with a slight delay of two months.

Description of the activities

During the reporting period, the activities of task T3.4, stated at month M8, have been completed. The progress of the work carried out is described in the following paragraph.

T3.4: Interoperability Middleware

As reported in the DoW, the Interoperability Middleware is responsible of guaranteeing a seamless integration among the end-user services of the HEARTFAID Platform. The activities of this task, started at month M8, have been successfully completed during the reporting period with a slight delay of two months from the expected deadline.

After having adopted the methods and technologies selected in the previous period as suitable for the purposes of the HEARTFAID project, such as *Message Oriented Middleware*, *Service Oriented Application*, *Enterprise Portals* and *Enterprise Service Bus*, the main components of the platform have bee successfully integrated:

1. The **AmI-platform** (Ambient Intelligence Platform)

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2. The **eCRF** (electronic Case report Form)
3. The **groupSMS**
4. The **CDSS** (Clinical Decision support System)
5. An image analysis and archiving toolkit based on the DICOM standard.

All these module are interacting on the basis of a single *Master Patient Index* to guarantee the unique identification of the patients, a *Documental Repository* to store the reports produced within the platform, a *Meta-data Registry* to locate the available resources, an *Orchestration service* to control the workflows within the platform and the *Heartfaid Enterprise Portal* to integrate the different functionalities and exhibit them to the final user in a friendly fashion.

Some troubles have been encountered in integrating the external eCRF, that is a Cardiovascular Medical Record developed in the context of the HEARTFAID but independently from the HFP itself.

The eCRF represents the Health Information Systems of a healthcare structure in a real context and it has been used to demonstrate the flexibility and the openness of the platform. In fact, we have successfully proven that all the clinical or demographic data needed by the different modules of the platform, can be accessed and retrieved from an external module that adopts standard interaction mechanisms (such as IHE profiles and HL7 messages) without the need to implement any specific integration module or mechanism.

Therefore, the HFP is able to retrieve the needed information on behalf of the modules that perform a request of data. In other words, the modules of the platform don∅t even need to know where the data is stored, whether it is located inside or outside the platform, or if specific credentials are needed to access them; on the contrary, each module can perform a request of data directly to the platform that, using its orchestration services and data management modules, is able to retrieve the needed information in a completely transparent way for the requesting module.

Ongoing workpackages progress: WP4

WORK PACKAGE: 4
TITLE: KNOWLEDGE, REPRESENTATION, DISCOVERY AND MANAGEMENT
START DATE: Month 8
WORK PACKAGE LEADER: RBI
PARTNERS INVOLVED: UNICAL, SYNAP, CNR, FORTH

STATUS OF TASKS DUE IN THIS PERIOD

TASK	TITLE	COMMENTS
T 4.3	Implementation of Knowledge Discovery in database processes	We started with comparative analysis of different approaches for the selection of most relevant attributes. A paper illustrating various approaches on the ANMCO dataset has been prepared. Also three abstracts have been prepared for the Conference on computers in cardiology reporting different results obtained on the project. We started experimental work on visualization of data mining results and transformation of short sequences into standard tabular form that can enter knowledge discovery process.

FORECAST STATUS OF TASKS DUE IN THE NEXT 3 MONTHS

TASK	N°	COMMENTS
Implementation of knowledge discovery in database processes	T 4.3	First results with the visualization of knowledge discovery results are expected. Additional experiments with the ANMCO dataset will be performed. We will continue with dissemination activities.

Description of the activities

In this period we concentrated our activities on critical evaluation of results reported in D29 and their preparation for publication. Additional experiments have been performed on the ANMCO dataset and a paper comparing different approaches for attribute ranking has been prepared. The good news is that the random forest approach selected for the on-line implementation has demonstrated outstanding performance on this task. We have also prepared three abstracts for the conference "Computer in Cardiology" that present different aspects of the knowledge discovery results with retrospective data and data collected specially for the project.

We have started with practical implementation of visualization of data mining results. The implementation should be useful for off-line but also for on-line application and as such will be used for the web application within the platform. First concrete results can be expected in the next period. Additionally, we have done extensive experiments with the transformation of short symbolic sequences into standard tabular form appropriate as input for machine learning. The methodology has been tested on HF patient data and some biological domains. The experiments demonstrated that extensive construction of features can help in increasing the predictive quality of induced models but that the optimum is achieved already with a relative small number of constructed attributes. The experimental work will continue also in the next period.

Ongoing workpackages progress: WP5

WORK PACKAGE: 5
TITLE: DATA PROCESSING AND DECISION SUPPORT DEVICES
START DATE: MONTH 5
WORK PACKAGE LEADER: CNR
PARTNERS INVOLVED: UNICAL, UNICZ, SYNAPSIS, FORTH, RBI

STATUS OF TASKS DUE IN THIS PERIOD

TASK	TITLE	COMMENTS

T 5.4	Implementation of the Decision Support System	- For the development of the Clinical Decision Support System (CDSS):
		· implementation of the Object Level of the CDSS Brain, i.e., the ontological knowledge base, the inference engine and the model base;
		· further work on the signal & image processing functionalities by:
		  ○ further testing and adaptation of the QRS algorithm to the files acquired by the Archimed 4210 cardiograph used in Catanzaro. Finalization of the QRS classification for the dominant beats on the MIT-BIH Arrhythmia Database;
		  ○ development of an integrated desktop application for image processing;
		- For the integration with the other platform components:
		· integration of a DICOM-compliant web-viewer application for clinical access to patients and studies;
		· development of a web-based user interface, providing several user contexts;
		· study and design of a patient database containing data relevant to the CDSS reasoning.
		- Preparation of the review meeting in Milan
		· implementation of the CDSS functionalities for the õsecond-year demoö;
		· set-up of an early mock-up of the final demo.
		- Preparation of a paper accepted at the Int. Conf. on Mass-Data Analysis of Images and Signals in Medicine, Biotechnology, Chemistry and Food Industry, and of two papers accepted at the 35th annual Computers in Cardiology Conference

FORECAST STATUS OF TASKS DUE IN THE NEXT 3 MONTHS

TASK	N°		COMMENTS
Implementation of the Decision Support System	T 5.4		In the next three months, the CDSS prototype will be set up

Description of the activities

Task 5.4 ó Implementation of the Decision Support System

The activity focused on the implementation of all the necessary CDSS functionalities for the final showcase, concerning *patientøs management*, which will be finalized for the end of the project.

In particular, most of the work concentrated on the main components of the CDSS architecture, but the development of some parts of the other components of the platform turned out necessary for testing all the services required by the showcase.

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Dealing with the CDSS, a revision of the HF ontology was made by RBI. The aim was to correct some medical inconsistences detected during the first testing phase of the knowledge base and to enable faster reasoning on the ontology. The ontology is now in the form that it can be made public. Additionally, the procedural knowledge was organized so that faster inference is possible, specially for web based applications. The decisive point is also a more efficient fetching of patient data from the case report form. This issue will be our main task in the next period, together with the dissemination activities.

Furthermore, CNR re-organized the ontological knowledge base by developing a suite of core ontologies related to:
- Patients
- Minnesota Questionnaire
- Anamnesis
- Diagnostic Procedures
- Pathological Conditions
- Signs and Sympthoms
- Telemonitoring
- Therapies

which were integrated via an upper HEARTFAID ontology. The difficult and complex formalization of therapy assignment was also faced by developing a dedicated ontology by UNICAL. This way, efficiency and manageability were assured. The ontologies were built in OWL using the Protégé tool. References to tokens of UMLS and SNOMED were also added to the ontology concepts. The inference rules related to HF patientsø management were further refined during a meeting hold in Catanzaro between CNR and UNICZ. Jena was used for formalizing the rules and, thus, populating the knowledge base and for developing the inference engine. Instances population and consistency tests were also started. The following functionalities were set up:
- interpretation of the Minnesota Questionnaire and determination of the NYHA class;
- interpretation of the telemonitoring parameters;
- detection of patientøs decompensation;
- computation and reading of the ECG and Echo examinations.

Large parts of the functionalities related to therapy assignment and dosage was also developed. A meeting with UNICAL was held in Pisa during February for tuning the development of these parts.

Regarding the early detection of patientøs decompensation, a computational reasoning model was developed by UNICAL and inserted into the CDSS model base.

So far, the integration of the components of the CDSS object level was implemented through a service-oriented strategy via web-services technologies (CNR & SYNAP).

Results obtained so far were reported in a paper accepted for oral presentation at the 35th annual Computers in Cardiology Conference, which will be held in Bologna in Septmber.

Dealing with the CDSS functionalities related to signal & image processing, FORTH and CNR carried out further activities were for tuning and testing the developed algorithms.

In particular, FORTH tested the algorithms for QRST classification on the 74 ECGs provided by the hospital of Catanzaro, with satisfactory results. The algorithm was further extended for the beat alignment (horizontal and vertical) evaluation before the centroid estimation.

The MagIC Vest was integrated by FORTH in the HEARTFAID platform with the creation of the HR series and RespR series. The software was properly integrated in the Nurse@Home application for the home monitoring of the patient and the average RR was evaluated and sent together with the other measurements to the data repository.

Next steps will be the proper storage in SCP-ECG format of the centroids for all the leads as reference beats in section 5 of the SCP-ECG file and the deployment of the software in the hospital of Catanzaro for the clinical validation. Also technical support for the duration of the clinical validation will be provided.

CNR carried on the development of a suitable user interface for the available image processing algorithms. The goal is to obtain a desktop application which should allow the visualization of chest X-rays and US images, performing common linear measurements, retrieving/storing images from/to the HEARTFAID Image Archive and triggering the automatic image segmentation algorithms already available. The current version of the desktop application, developed in JAVA, relies on the DCM4CHE toolkit, the TUDOR DICOM viewer and JGoodies.

HL7 export of the computed parameters and database writing procedures are also in progress.

Related to diagnostic images management, a DICOM web-viewer application was included in the HEARTFAID platform by CNR. The application is able to interact with the HEARTFAID Image Archive by using DICOM network services including WADO. The web-viewer now supports DICOM multi-frame images which are commonly encountered in US examinations and is able to display such images in CINE-mode. The DICOM web-viewer was integrated in the general web-user interface which is being prepared for the final demo. Such integration allows maintaining the patient context across the involved applications.

Additionally, for testing all the functionalities to be provided for the *patient's management* showcase, parts of other platform components were sketched: a web-based graphical user interface, able to handle different users' contexts (five main users' class were considered, i.e., *patient, physician, sonographer, haematologist* and *radiologist* with ontology-based authentication and authorization), and a database containing the patients' data relevant to CDSS reasoning.

A great part of the showcase functionalities was implemented and illustrated at the steering meeting and at the review meeting held in Milan, in February and April, respectively.

The main results of the signal & image processing methods and their integration within the CDSS were reported in a paper, titled "Biomedical Signal and Image Processing for Decision Support in Heart Failure", which was accepted for oral presentation at the Int. Conf. on Mass-Data Analysis of Images and Signals in Medicine, Biotechnology, Chemistry and Food Industry, which will be held in Leipzig in July, and in a poster accepted at the 35th annual Computers in Cardiology Conference, which will be held in Bologna in September.

Ongoing workpackages progress: WP6

WORK PACKAGE: 6
TITLE: END-USER APPLICATION AND SERVICES
START DATE: MONTH 10
WORK PACKAGE LEADER: FORTHNET
PARTNERS INVOLVED: UNICAL,UNIMIB, JUMC, CNR,FORTH,RBI

STATUS OF TASKS DUE IN THIS PERIOD

TASK	TITLE	COMMENTS
T 6.2	Development of End-User applications and services	All the HEARTFAID services that have been developed up to M24 were tested through the Front-end, in order to ensure their interoperability. Furthermore, apart from the automatic generated SMS service that was further tested, the end usersø generated SMS service has also been finalized and is already available through the Front-endøs web interface.
T 6.4	Integration of services	All the services that have been developed up to M24 are integrated to the HEARTFAID frontóend and have been made available to the consortium for testing purposes. These services have also been presented at the second review of the project, in an integrated form through the Front-end (HEARTFAID portal).

STATUS OF MILESTONES DUE IN THIS PERIOD

MILESTONE	TITLE	COMMENTS
M.S.6.1	Early Mock-up prototype of the HEARTFAID web-based platform of services	The first official prototype of the HEARTFAID web-based platform of services was developed by M24 and was demonstrated at the second project review meeting, along with a detailed presentation of its integrated features and provided services.

FORECAST STATUS OF TASKS DUE IN THE NEXT 3 MONTHS

TASK	N°	COMMENTS
Integration of services	T 6.4	.Further testing of the already available HEARTFAID services will take place in the following months, in order to ensure proper interoperability and flawless operation of these services via the Front-end.

Description of activities

T6.2 Development of End-User applications and services

The **Instant Alert & Notification system** consists of two kinds of end-user services, both of which have been demonstrated at the Second review meeting in Milan. The first case makes use of an intelligent patient data analysis system whereby when a health risk is determined, the automatic triggering mechanism is being activated and an appropriately formulated Short Messaging System (SMS) alert is being transmitted to a pre-selected list of end-users, including the patient, the patientøs doctor and any predefined patientøs relatives, neighbors or other people who can be of immediate assistance. The second case involves a manual composition of an electronic message warning, by the medical professional, who has access to the on-line SMS generation platform through the Front-End and has valid indications that such an action is necessary and appropriate.

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Both services have been developed and implemented exclusively for
mobile devices (mobile phones, PDAs) and are being utilized in order to provide
the HEARTFAID platform with the enhanced one and two-way communication
services for the mobile users, available over the GSM network.

Various tests have also been performed, concerning the end-users authorization
process, in order to access the HEARTFAID front-end. A number of different
scenarios have been considered, in order to define specific access levels,
according to the end-user's attributes.

Furthermore, various front-end Graphical User Interface design templates have
been created, in order to provide an improved replacement for the existing one.
The new templates incorporate better õlook & feelö design issues, as well as easier
user navigation through the HEARTFAID services and an additional õnewsletterö
functionality, aiming at informing the end users (medical professionals) about
major forthcoming events and announcements.

T6.4 Integration of services

Many integration issues, regarding the HEARTFAID services, have been
addressed during the last three months and a significant number of these services
have already been integrated to the Front-end and were presented at the second
review meeting.

In most cases, iFrames have been developed within the Front-end since they solve
the problem of a double user registration when various services, that required
separate authorization, are invoked. That offers an enhanced and user-friendlier
interface and site navigation, while it also minimizes further security aspects,
associated with the transmission of sensitive data to a distant location. The users
will get authenticated once, at the Front-End, and their session information will
get propagated to the appropriate server. iFrames are also providing faster load of
the Front-end embedded services.

The following services and functionalities have been integrated to the Front-end,
up to M27:

Patient Records
- É   General Patient Enrollment
- É   Electronic Case Report Form (eCRF)
- É   Search for a patient

Knowledge Discovery
- É   Knowledge Discovery
- É   Data Acquisition

Clinical Decision Support System
- É   Assign / Check DSS services

AmI (Sensor Data)
- É   Assign / Check monitoring resources

Ongoing workpackages progress: WP7

WORK PACKAGE: 7
TITLE: TESTING AND VALIDATION
START DATE: MONTH 25
WORK PACKAGE LEADER: UNIMIB/AUXOL
PARTNERS INVOLVED: UNICAL,UNICZ,UNIMIB, JUMC, VMWS,FORTHNET,SYNAP

STATUS OF TASKS DUE IN THIS PERIOD

TASK	TITLE	COMMENTS
T 7.1	Deployment of the prototypes in suitable clinical settings	Definition of the clinical context where the platform could be usefully tested and validate.

FORECAST STATUS OF TASKS DUE IN THE NEXT 3 MONTHS

TASK	N°	COMMENTS
Deployment of the prototypes in suitable clinical settings	T 7.1	Assessment and refinement of the performance of the platform components and services during testing and validation
Clinical validation	T 7.2	Definition of the health care scenarios for testing and validation. Definition and implementation of the clinical protocol for testing and validation. Patient enrolment and execution of clinical testing.

Description of activities

In this period, mainly at **UNIMIB** and **AUXOL**, the work necessary to prepare the WP7 activities has been started. To this aim UNIMIB and AUXOL have proposed a protocol focused on the collection of the set of parameters defined in our previous deliverables. These parameters should be collected from patientsø home making use of methods available at the various clinical centers.

These patients should be followed-up for at most 6 months, with the aim of comparing the indications on management provided by the platform with the decision spontaneously taken by the physicians in charge.

Finally, a preliminary definition and assessment of the characteristics of the clinical settings, where the platform services will be deployed, tested and evaluated, has been performed.

Ongoing workpackages progress: WP8

WORK PACKAGE: 8
TITLE: DISSEMINATION AND EXPLOITATION
START DATE: MONTH 1
WORK PACKAGE LEADER: UNICAL
PARTNERS INVOLVED: ALL

STATUS OF TASKS DUE IN THIS PERIOD

TASK	TITLE	COMMENTS
T 8.1	Dissemination activities	The dissemination activities have been mainly characterized by internal dissemination and preparation and submission of scientific and technical papers.
T 8.2	Exploitation activities	The exploitation activities have been continued mainly on the basis of the assessment of the new organization and management model proposed in the deliverable D8, and related cost/benefits analysis.

FORECAST STATUS OF TASKS DUE IN THE NEXT 3 MONTHS

TASK	N°	COMMENTS
Dissemination activities	T 8.1	The activities will carry out with more stressing to collaboration and involvement of the medical professional associations
Exploitation Activities	T 8.2	The activities will continue with the analysis and evaluation of the potential market for the final results of the project.

Description of the activities

All the partners have continued the dissemination activities, mainly by organizing specific events for internal dissemination of the current project results.

Strong efforts have been addressed also for the preparation and submission of several scientific and technical papers to journal and conference. In particular, the Consortium prepared and submitted 8 abstracts to the well known International Conference õComputers in Cardiologyö, which will be held in Bologna (Italy) the next Sept. 2008.

FORTH

Dissemination activities performed by FORTH in this period were:
- Submission of two abstracts for computers in cardiology 2008. Notification of acceptance will be by June 15:
    o F. Chiarugi, I. Karatzanis, G. Zacharioudakis, P. Meriggi, F. Rizzo, M. Stratakis, S. Louloudakis, C. Biniaris, M. Valentini, M. Di Rienzo, G. Parati. õMeasurement of Heart rate and Respiratory Rate Using a Textile-Based Wearable Device in Heart Failure Patientsö.
    o F. Chiarugi, D. Emmanouilidou, I. Tsamardinos, I.G. Tollis. õMorphological Classification of Heartbeats Using Similarity Features and a Two-Pahse Decision Treeö.

- Cooperation to the preparation and submission of a paper to the IHIC 2008 conference. Notification of acceptance will be by June 30:
    - S. Di Bona, D. Guerri, M. Lettere, R. Fontanelli, F. Chiarugi, A. Marsh, O. Salvetti. "An Integrated and Interoperable Platform of Services for the Management of Heart Failure"
- Cooperation to the preparation of a paper for the MDA 2008 conference (accepted for oral presentation):
    - F. Chiarugi, S. Colantonio, D. Emmaouilidou, D. Moroni, O. Salvetti. õBiomedical Signal and Image Processing for Decision Support in Heart Failureö.

Planned activities for the next three months:
- Preparation of a paper for the Hellenic Journal of Cardiology
- Preparation of the full papers if the submitted abstracts for computers in cardiology 2008 will be accepted
- Preparation of 1 or 2 papers for the BIOSTEC 2009 conference (deadline June 27)

JUMC

JUMC has continued the previously started HEARTFAID dissemination activities by increasing the awareness of Heartfaid project and its current results within medical personnel in our institution, and HF patients/their relatives visiting hospital and ambulatory unit. Moreover, we have kept informed about the progress within the project the following professional health care associations with their units in Krakow: Polish Cardiac Society and Polish Society of Hypertension.

The information on HEARTFAID is 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.

Dissemination activities of the period

Date	Channel	Event	Place/ Country	Partner responsible	Nature and size of audience
26.-27. March 2008.	invited presentation	Fifth international workshop on knowledge technologies	Bohinj/Slovenia	RBI	35 computer scientists from Slovenia and Croatia

Future activities and dissemination

Date	Place	Event	Partner responsible	Description
25.-28. May 2008.	Goeteborg, Sweden	Conference Medical Informatics in Europe (MIE 2008)	RBI	Presentation of the work "Semantic web ontology utilization for heart failure expert system design".
14 July 2008	Leipzig, Germany	Int. Conf. on Mass-Data Analysis of Images and Signals in Medicine, Biotechnology, Chemistry and Food Industry	CNR, FORTH	Oral Presentation
16-18 July 2008	Leipzig, Germany	8th Industrial Conference on Data Mining ICDM´2008	CNR	Oral Presentation
14-17 September 2008	Bologna, Italy	35th annual Computers in Cardiology Conference	CNR, UNICAL, UNICZ	Oral Presentation
14-17 September 2008	Bologna, Italy	35th annual Computers in Cardiology Conference	CNR, FORTH, UNICZ	Poster Presentation