EUMEDIS 110

Euro-**M**editerranean **I**nternet-**S**atellite **P**latform
for **H**ealth, medical **E**ducation and **R**esearch

Project Presentation
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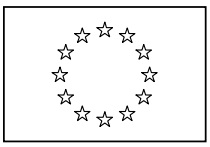
Project Applicant: OP 2000, RRK/MDC, Charité

Contributing Partners: Charité, ANDS, Univ. Cyprus, Ain Shams, MOHP, Univ. Casablanca, Univ. Istanbul, Eutelsat, TTSA, CICE, EHTEL, IMA, SEPELM, FORTH, ISMETT, Demokritos



EUMEDIS Pilot Projects
Strand 2 - Sector 1

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DELIVERABLES SUMMARY SHEET

Project Number: EUMEDIS 110

Project Acronym: EMISPHER

Title: Euro-Mediterranean Internet-Satellite Platform for Health, medical Education and Research

Deliverable N°: D1.1

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Short Description:

This document gives a short overview of project goals, key issues, technology used, networks to be set up and used, foreseen dissemination activities, list of participating organisations, institutions, companies and their role in the project, as well as the contact coordinates for further information.

It aims to give an attractive presentation of EMISPHER for persons and entities outside the project, but interested in health care activities in the Euro-Mediterranean arc.

Applicant: Surgical Research Unit OP 2000, Robert-Roessle-Klinik at the Max-Delbrueck-Center for Molecular Medicine,
University Hospital Charité, Humboldt University at Berlin,
Germany (OP 2000, RRK/MDC)

Version Control

Version	*Date*	*Author*	*Author's Organisation*	*Changes*
0.1	30.11.02	Theo A. Roelofs (EMISPHER Manager)	Charité	Preparation
		Yoani Matsakis (PSC)	TTSA	Corrections & Approval
		Lydia Gaillard-Faghihy (PSC)	Eutelsat	Corrections & Approval
		Gamal Wafa (PSC)	Aïn Shams	Corrections & Approval
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		Cavit Avci (PSC)	Univ. Istanbul	Corrections & Approval
		Renato Ruggiero (PSC)	IsMeTT	Corrections & Approval
1.0	20.12.02	Georgi Graschew (EMISPHER Coordinator)	Charité	Final Corrections & Approval; Submission to the EC
1.1 final				

Table of Content

1. Project Identification

Contract Number: EUMEDIS B7-4100/2002/2165-083 P110

Project Acronym: EMISPHER

Project Name: Euro-Mediterranean Internet-Satellite Platform for Health, medical Education and Research

Action Line: EUMEDIS, Strand 2, Section 1

Total Costs: 2.350.101 Euro

Commission Funding: 1.774.327 Euro

2. Main Goals

The main goals of EMISPHER are to:

- establish equal access for all countries of the Euro-Mediterranean area to the quality of service which is required for the delivery of on-line services for health care,
- in order to widely promote and disseminate high priority application services,
- and developing a sustainable economic model for a minimum set of quality services

3. Key Issues

EMISPHER will host three priority applications :

- e-learning applications to develop the concept of cross-Mediterranean **Virtual Medical University (WP 2)**; establish a permanent medical and scientific link and contribute to limit corresponding emigration flows.

  Initial emphasis will be on the following medical fields:
  - gynaecology obstetrics & reproductive medicine,
  - surgical techniques & especially minimally invasive surgery,
  - Interventional Imaging,
  - infectious diseases & vaccination,
  - organ transplantation & liver disease management,
  - new technologies in tumour diagnosis & therapy
- **real-time telemedicine applications (WP 3)** for access to remote expertise and second opinion and foster cross-Mediterranean cooperation at expert level and for research.
- shared management of the **medical assistance (WP 4)** in case of repatriation of travellers or expatriates, a service which is expected to significantly contribute to the **continuity of care** throughout the whole Euro-Mediterranean arc.

  In most of the countries of the Mediterranean arc, tourism constitutes a major source of income and Europeans constitute the main cohort of foreign visitors. Improving the image of medical care in relation with tourism is considered of major interest, particularly as an increasing number of aging populations is travelling.

4. Technology: general description and implementation (WP 5)

The project is putting together the cutting-edge European technology developed and validated in the frame of previous EU-funded projects, to provide an integrated Internet-Satellite platform, dedicated to health applications, and covering the whole Euro-Mediterranean area (see Fig. 1). Mature satellite technologies, such as shown in the GALENOS project (Generic Advanced Low-cost trans-European Network Over Satellite), can be cost-effective, if combined with appropriate internet application services. Such an integrated internet-satellite platform can guarantee the required bandwidth when and where required, and therefore achieve the required quality of service (response time, quality of video transmissions and large medical records, synchronisation of databases etc.).

A network of 10 expert centres (medical faculties and leading hospitals) will be permanently interconnected and create a network of contributing medical centres, able to foster the widest long-term cooperation (**contribution network)**. These centres will be equipped with bi-directional satellite terminals enabling a permanent connection between the various regional areas. The network will have a mesh topology and allow for a transmission bandwidth of up to 2 Mbps. It is the intention of the project to extend this network to up to 25 centres, on the basis of public regional or private initiatives.

The centres of the contribution network will work as "hub" centres for a wider network, built on the existing cooperation in the medical assistance area, constituted of 250 medical centres (**distribution network**). These centres will be interconnected using a technology demonstrated in project ET-ASSIST (European Telemedicine for Medical Assistance) enabling the exchange of multimedia patient record elements and the electronic management of the workflow in relation with medically assisted repatriations.

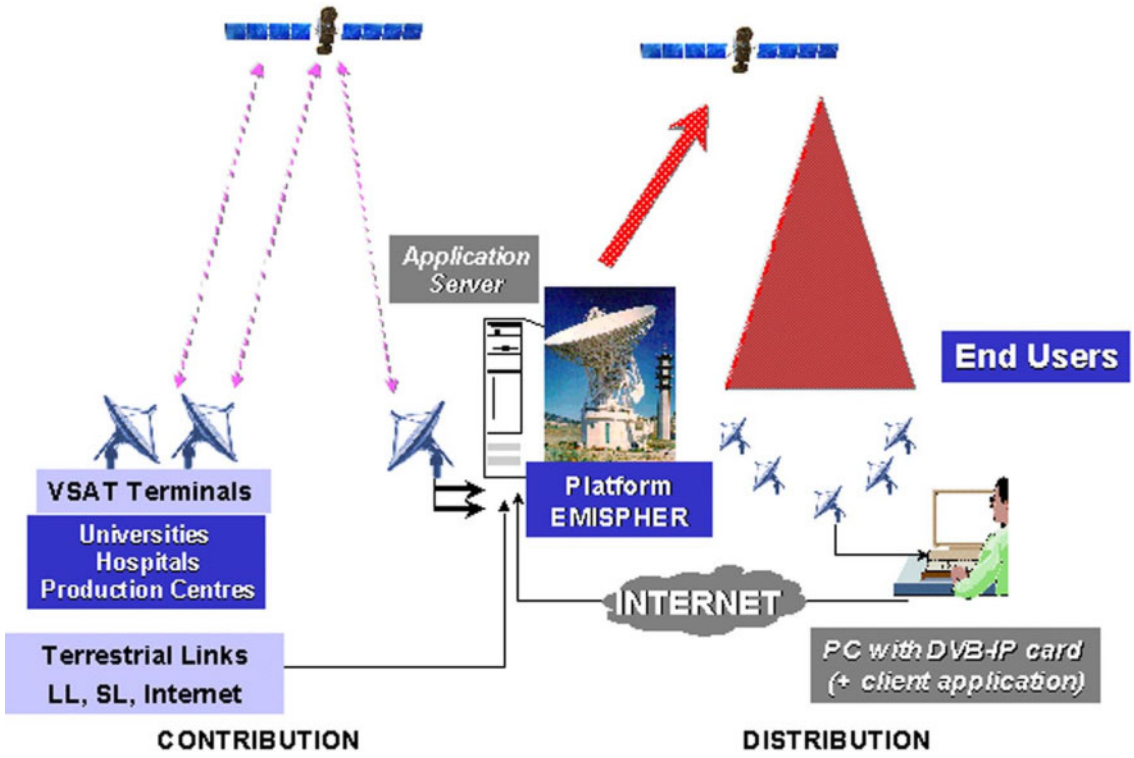

Fig 1: General architecture of the EMISPHER Platform

4.1. Interactive Video Communication system WoTeSa/WinVicos

A fundamental component of the satellite-based contribution network is the hardware and software able to establish interactive video communications between the medical centres for exchange of information and clinical data. The identified video conference system is the combination of **WoTeSa** (Workstation for Telemedical Application via Satellite) hardware with **WinVicos** (Wavelet based Interactive Video Communication System) software. The communication software WinVicos is a high-end, interactive videoconference software, providing real-time video-, audio- and image-transmission. WinVicos has specially been designed and developed for different telemedical applications by the Charité Hospital at Berlin, and has widely been used within the GALENOS project.

WoTeSa consists of off-the-shelf components: an IBM-compatible PC with a Pentium® 4 processor (≥2.8 GHz), ≥1024 Mbytes RAM, an Osprey Video-capture board, a LAN-Ethernet network board (for LAN, Ethernet, ATM) and a sound board; a camera with S-Video and Composite output as live source, optionally a second camera as document camera (for transmission of non-digital images; digital images can be transmitted directly by the WinVicos software); standard headset, or microphone in combination with small loudspeakers. The analogue outputs (preferentially S-Video format) of various medical imaging instruments can be fed directly into the Osprey video capture board. Via cascading of two Osprey boards, up to 6 sources can thus be transmitted directly.

The communication software WinVicos is a high-end, interactive video conference software, providing real-time video-, audio- and image-transmission. It enables point-to-point as well as multipoint videoconferences. The video conference partners can see each other, talk, exchange images and even use remote pointers to highlight certain details. Beside the main user interface up to four windows can be shown on the user's desktop (see Fig. 2): a self-view with the live video source being sent to the conference partner, a guest-view showing the video stream received, and up to two windows showing still-images sent to the partner or received from him. Transmitted and received video streams can be recorded and stored on the computer. For video compression WinVicos employs a hybrid speed-optimised wavelet-codec, based on the concepts of Partition, Aggregation and Conditional Coding, PACC ("Deutsche Telekom", Patent DE 197 34 542 A1).

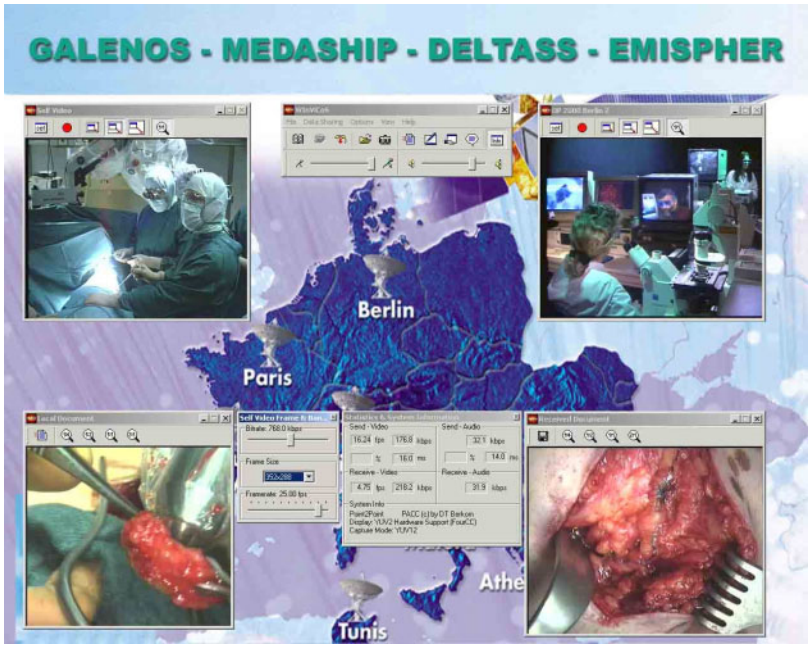

Fig. 2: WinVicos user's desktop

4.2. Satellite-based Contribution Network: Functional features

- meshed network topology.
- avoidance of a "single point of failure", as may otherwise be the case with the Hub of a star topology network.
- full addressability of "end users" connected on LAN's, WAN's, via PABX, etc.
- possibility for dynamic variation of bit rate within the operational range.
- compatibility with and adaptation to the assigned space segment capacity.
- interoperability with terrestrial infrastructures (heterogeneous network interfacing and management) through the utilisation of the IP protocol suite.
- possibility to manage the network (NMC) from one of the traffic terminals (with back-up capability), with the addition of the necessary software, thereby relieving functional dependency on a dedicated facility (hub).
- built-in test and monitoring facilities
- possibility to "pay per use" for data & voice, according to duration, bit rate, and priority status, by providing all the necessary subscriber management tools for subsequent billing by the service provider
- possibility to access and quit the network as required, rather than occupy (and pay for) the resource for idle periods (DAMA: demand-assigned multiple access)

4.3. Internet-based Distribution Network: Functional Features

The internet platform information system has been designed and developed in order to offer a maximum level of security. The system is made of :

- a WEB Server (HTTP and SSL compliant)
- a RDBMS Server (storing the medical data and system databases)
- a Firewall to protect the system

The WEB server is publicly accessible from the Internet but secured by the Firewall. The RDBMS Server is not accessible by the Internet, only the WEB Server can perform requests.
The firewall filters, at the TCP/IP and application levels, accesses from the Internet to the private network and the demilitarised zone :

- Only the HTTP and HTTPS traffic is authorised from the Internet to the WEB SERVER
- No traffic is authorised from the Internet to the RDMBS and vice versa
- Only the HTTP server can perform requests to the RDBMS
- The Firewall ensures that IP Spoofing is not possible and denial of service attacks are not possible too.

This architecture provides a good level of security as the medical data are not reachable from the Internet.

In addition, the communication channel is SSL encrypted (128 bits) and the server is authenticated using a X509 certificate. In the present stage, access rights are controlled via logins and passwords. The use of Health Professional Cards or of Patient Health Cards has been foreseen and will be possible where their deployment is effective. Electronic signature is integrated in this secured internet system.

4.4. EMISPHER Solution for the Integrated Internet-Satellite Platform

The main objectives concerning the integrated Internet-Satellite Platform solution chosen by EMISPHER are:

- To evaluate the best way to combine Internet and Satellite for a coherent and viable service offer for the medical communities in the Euro-Mediterranean area
- To proceed with the necessary adaptations to ensure the best integrated service to all concerned Euro-Mediterranean countries
- To propose flexible solutions, both technical and commercial, for the link between existing regional networks in the Euro-Mediterranean area
- To communicate about the existing solutions through international conferences and web sites in order to create awareness about the integrated Internet-Satellite solutions for the medical sector.

5. Training & Dissemination (WP 6)

Awareness of the users, training of a large number of users, exchange of experiences and dissemination will be organized mainly through 4 major international events funded by the project and organized in:

- Egypt, on “Public Health in the Euro-Mediterranean countries”,
- Morocco, on “Medical E-Learning”,
- Cyprus, on “Continuity of medical care”
- Turkey, on “Telemedicine – optimal medical practice”

Such events will be open to the widest medical community.

6. Expected Achievements & Impact

This project will greatly improve the Health Care system of the region by:

- Interconnecting hospitals, medical institutions and universities and facilitating cooperation and exchange among physicians and other health professionals within the Euro-Mediterranean region;
- Offering new distance learning services via videoconference and internet for medical education, facilitating communication between educational institutions and sharing of libraries and databases of research information;
- Fostering the dissemination of medical expertise thanks to teleconsultation services;
- Re-enforcement of new tools and methodologies in health care management that will support familiarisation, mutual comprehension and enable collaboration between Euro-Mediterranean health professionals;
- Reinforcing the effectiveness and the quality of work of the Euro-Mediterranean through the sharing of localised resources and findings.

7. List of Participants and their Role in the Project

- **Surgical Research Unit OP 2000, Robert-Roessle-Klinik (RRK), Charité Hospital, Berlin, Germany:**
  - *Project Coordinator / Manager (Leader WP 1: Coordination & Management)*
  - *Leader WP 3: Real-time Telemedicine (WoTeSa/WinVicos)*
  - *Leader WP 6: Information Dissemination & Exploitation*
  - *Leader WP 7: Results Evaluation*
- **ANDS (National Agency for Health Documentation), Alger, Algeria:**
  - *Multimedia contribution on infectious diseases and vaccination (WP 2)*
  - *Definition and specification of collective database functionalities (WP 3)*
  - *Information Collection & Dissemination, EMISPHER Newsletter (WP 6)*
  - *Integration of local Algerian projects (WP 6)*
- **University of Cyprus - Dept. of Computer Science, Nicosia, Cyprus:**
  - *Contributions in modern technologies in tumour diagnosis & therapy (WP 2)*
  - *Definition and specification of collective telemedicine database functionalities (WP 3)*
  - *Leader WP 4: Medical Assistance*
  - *Definition of requirements for site selection and client software (WP 4)*
  - *Organisation of the 3rd EMISPHER Conference on "Continuity of Care" (WP 6)*
  - *Local Cypriote dissemination (WP 6)*
- **Aïn Shams University, Cairo, Egypt:**
  - *Leader WP 2: Virtual Medical University (with CICE)*
  - *Multimedia contribution on Obstetrics & Gynaecology (WP 2)*
  - *Organisation of the 1st EMISPHER Conference on "Public Health" (WP 6)*
- **Ministry of Health and Population of Egypt (MOHP), Cairo, Egypt:**
  - *Continuous education module on transplantations (WP 2; with IsMeTT)*
  - *Coordination and integration of local Egyptian projects (WP 6)*
- **University Hassan II, Medical and Pharmacy Faculty, Casablanca, Morocco:**
  - *Multimedia contribution on reproductive medicine (WP 2)*
  - *Multimedia contribution on interventional imaging (WP 2)*
  - *Analysis of the medical content of real-time teleconsultations (WP 3)*
  - *Organisation of the 2nd EMISPHER Conference on "E-Learning" (WP 6)*
  - *Integration of local Moroccan projects (WP 6)*
- **La Rabta Hospital, Tunis, Tunisia:**
  - *partner left the project by own request; will soon be replaced by an appropriate new Tunisian partner*
- **Istanbul University, Continuing Medical Education and Research Center (ISTEM), Istanbul, Turkey:**
  - *Contributions on minimal invasive surgery (WP 2)*
  - *Report and Analysis of live tele-teaching, -training & -education (WP 3)*
  - *Organisation of 4th EMISPHER Conference on "Telemedicine" (WP 6)*
  - *Coordination & Integration of local Turkish projects (WP 6)*
- **Eutelsat S.A., Paris, France:**

- *Leader WP 5: Network Deployment & Monitoring*
- *Deployment, operation and monitoring of the satellite network (WP 5)*
- *Integration of multimedia platform for medical applications (WP 5; with TTSA)*
- *Validation of sustainable telemedical services, business plan (WP 6)*
- *Evaluation of the communication resources' occupancies (WP 7)*

- **Telemedicine Technologies S.A., Boulogne-Billancourt, France:**
  - *Support integration of e-learning modules (WP 2)*
  - *Deployment and operation of the medical assistance platform (WP 4)*
  - *Deployment & operation of the internet platform (WP 5)*
  - *Operation of the EMISPHER website (WP 6)*
- **CICE (International Center for Endoscopic Surgery), Clermont-Ferrand, France:**
  - *Coordination and integration of multimedia content for e-learning (WP 2)*
  - *Multimedia contribution on minimal invasive surgery (WP 2; with ISTEM)*
- **EHTEL (European Health Telematics Association, Brussels, Belgium:**
  - *Link with EU institutions and with other EU-funded projects (WP 6)*
  - *Dissemination & promotion of EMISPHER results via workshops (WP 6)*
  - *Results evaluation (WP 7)*
- **IMA (Inter Mutuelles Assistance S.A.), Niort, France :**
  - *Support of the medical assistance platform (WP 4)*
  - *Selection of user sites for medical assistance platform and on-site training (WP 4)*
- **SEPELM (Sociéte Europeènne Pour le E-Learning Medical), Paris, France:**
  - *Cooperation with the French Medical Virtual University UMVF (WP 2)*
- **FORTH (Foundation for Research and Technology), Institute for Computer Science, Heraklion, Greece:**
  - *Support operation of medical assistance platform (WP 4)*
  - *Provide gateways to local information systems (WP 4)*
  - *Activity assessment & guidelines for on-line training (WP 4)*
  - *Assessment & Evaluation of medical assistance activities (WP 4)*
  - *Evaluation of communication resources occupancies and bottle-necks (WP 7)*
- **IsMeTT (Instituto Mediterraneo per i Trapianti e Terapie ad Alta Specializzazione), Palermo, Italy:**
  - *Multimedia contribution on transplantation medicine & liver diseases (WP 2)*
  - *Telepathology services, real-time telemedicine (WP 3)*
  - *Participation in clinical research and multi-center trials (WP 2, WP 3)*
  - *Organisation of workshops on disease control (WP 3)*
- **NCSR "Demokritos" (National Center for Scientific Research), Athens, Greece:**
  - *Participation in real-time telemedicine applications (WP 3)*
  - *Explore and provide interoperability with terrestrial communication infrastructures; heterogeneous network interfacing & management (WP 5)*

8. Contact

For further contact:
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