Cardiological Diagnosis Network (CARDIODIAGNET)

V.D. Moga¹, T. Ciocârlie¹, Mariana Moga², Rodica Avram¹, R. Seromenho³, T.Cronje⁴, A.S. Anayiotos⁵, Guy Fleishman⁶, Roberta Bonifaci⁷, Lorenza Broccardo⁷, L. Bosneag², V. Stoicu-Tivadar⁸, Lacramioara Stoicu-Tivadar⁸

¹University of Medicine and Pharmacy “V.Babes” Timisoara, Romania
²Emergency County Hospital Timisoara
³Institute Agilus for Innovation in Information Technologies, Matosinhos, Portugal
⁴GeoMed MIT, Matieland, South-Africa
⁵Department of Mechanical, Materials Science and Engineering, Limassol, Cyprus
⁶GARD Ltd, Holon, Israel
⁷S-IN Soluzioni Informatiche Vicenza, Italy
⁸University “Politehnica” Timisoara, Romania
Cardiovascular diseases represent nowadays a major social and economic impact in EU and recent new EU member countries, being the leading cause of death in developed countries.
BACKGROUND

In most European countries, healthcare is fundamentally publicly funded and mostly publicly provided.

Healthcare spending represents a major component of state budgets and currently it ranges between 5 and 10% of GDP in the EU Member States.
Collaborative Project
To involve partners that are separated geographically by great distances.
The partners

Emergency County Hospital Timisoara, Romania

Institute Agilus for Innovation in Information Technologies, Matosinhos, Portugal

GeoMed MIT, Matieland, South-Africa

Department of Mechanical, Materials Science and Engineering Limassol, Cyprus

GARD Ltd, Holon, Israel

S-IN Soluzioni Informatiche Vicenza, Italy

University “Politehnica” Timisoara, Romania
CARDIODIAGNET is proposed to be a complex project in which non-invasive cardiology tools will be used to assess the cardiovascular health status of the patients.
A consortium of 6 partners has been formed with complementary expertise in:

a) ECG and heart murmurs signal processing;
b) Wavelet Analysis and/or Neural Networks;
c) Image based CFD of cardiovascular flow;
d) Software development and system integration;
e) Research in image processing and neural networks;
f) Developing pre-processing algorithms for ECG signals and heart sounds;
g) Cardiovascular related signals data bases and data analysis;
h) Database management system to archive signals and images.
Unfortunately many e-healthcare solutions in new EU members countries remains in the stage of local projects or are not used with all the potentials that such platforms can have.

CARDIODIAGNET was designed to be a functional solution in clinical cardiology decision, to be a tool for a better diagnosis.
Non-invasive: information will be acquired through non-invasive methods (ECG, electronic stethoscope, echocardiography and 2D vessels echography)
Open architecture – it will be possible to upgrade the system by adding or replacing components with new ones, once available on the market
Advanced and adaptive decision support capability – classical signal analysis techniques will be integrated with new ones (i.e. wavelet analysis, neural networks, image processing).
CARDIODIAGNET

Challenges
Define conditions where the project may be applied

We want to prove the impact on clinical cardiology.

In this task the aim is to find the optimal clinical situations that would prove our point.
TARGETS

Health care providers involved

Complex clinical conditions

Medical conditions where the effect of the decision can be easily observed and measured

The decision has a major impact on the patient and on the health care system

Situations or scenarios (emergencies) in which it is required quick medical decisions
Obtain online or asynchronous data from hospitals, family doctors, and research companies.
Recording on digital ECG and transmission of ECG signals;
Recording on echocardiography machines and transmission of the Echocardiography images (cardiac and/or vessels);
Recording of heart murmurs by digital stethoscope;
ECG signal processing;
Cardiac and vessels echographic images analysis;
Databases, including archives.
Telemedicine, e-health and e-learning proceedings
CARDIODIAGNET webpage

Creating a virtual private network between the users of this project
Infrastructure:

Server & VPN
Internet Connection
Data rate transfer: 8 Mbps – 10 Mbps
Laptops with hardware authentication keys
Digital ECG
Digital Video and Photo Cameras
Telemedicine portal

E-learning

Tele-education – distance education and training for physicians is used worldwide.

E-health – Tele-diagnostics

Image analysis
Telecardiology platform

Tele-counselling

Asynchronously (secure e-mail type interaction)

Interactively (through video-conferencing facilities)

E-learning – through video-conferences

e Health
# CARDIODIAGNET services

<table>
<thead>
<tr>
<th>Partner Centers</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCJUT</td>
<td>Management of the project</td>
</tr>
<tr>
<td></td>
<td>Biomedical signal analysis</td>
</tr>
<tr>
<td>ASB</td>
<td>Vascular signal analysis</td>
</tr>
<tr>
<td>IAITI SA</td>
<td>Software design and development</td>
</tr>
<tr>
<td></td>
<td>Telecardiology sessions</td>
</tr>
<tr>
<td>GARD</td>
<td>ECG signal analysis</td>
</tr>
<tr>
<td>GEOMED MIT</td>
<td>ECG signal analysis</td>
</tr>
<tr>
<td></td>
<td>Heart murmur analysis</td>
</tr>
<tr>
<td></td>
<td>Telemedicine sessions</td>
</tr>
<tr>
<td>S-IN</td>
<td>Database management</td>
</tr>
</tbody>
</table>
CARDIODIAGNET
A SUCCES?

Addressability
Doctors & Patients

Birocracy
Authorities

Founding
EU programs
Discussions...instead of Conclusions