New Tele-Cardiology Service for the Regional Healthcare System in Finland

A Case Study

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Med-e-Tel
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www.aerotel.com

Abstract

- We present preliminary results from a tele-cardiology pilot in Finland
- Ease of use, satisfaction and efficiency were evaluated by all stake-holders
  - Doctors
  - Nurses,
  - Administrators
  - Patients

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Aerotel Medical Systems

- A leading global supplier of modular, mobile & home based remote monitoring systems
- Providing devices and software for use by telehealth service providers
- Based in Israel, with a client base in 45 countries
- “Patient Monitoring Company of the Year Award 2006” by Frost & Sullivan
- “Innovation and Growth Strategy Leadership of the Year Award 2007” by Frost & Sullivan
- **Visit us at Med-e-Tel 2009 – stand 1C48**

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Applications & Solutions

- Homecare systems
- Chronic care
- Rehabilitation
- Mobile health systems
- Wireless personal alarm systems
- Tele-consultation

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Finnish Partners

- **Emtele – Technology and Service Provider**
  - A private service provider of scalable healthcare ICT platforms
  - Connects customer devices to services, enabling enterprises and communities to provide better service with smaller investments
  - Emtele eHealth infrastructure provides a managed connectivity environment for secure and easy to use remote diagnostic services
- **Satakunta Hospital District – Regional Healthcare Provider**
  - A public, municipality-owned, regional healthcare service provider in West Finland operating several regional hospitals and clinics
  - Working with regional basic health services and social services, offers specialized care for 226,000 residents in 24 member municipalities
  - Specialist services are provided at the Central Hospital of Satakunta, with additional regional hospitals and community clinics
  - The hospitals have approximately 612 beds in use

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The Solutions Used in the Pilot

- ECG monitoring devices
- ECG receiving software
- Remote access technologies
- Mobile personal computers
- PSTN/mobile phones, Internet Infrastructure

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HeartView™

12-Lead ECG Recorder/Transmitter

- User-friendly, ECG transtelephonic recorder/transmitter.
- Transmits 12-lead ECG data from any place and at any time over the phone to the HRS for immediate diagnosis.

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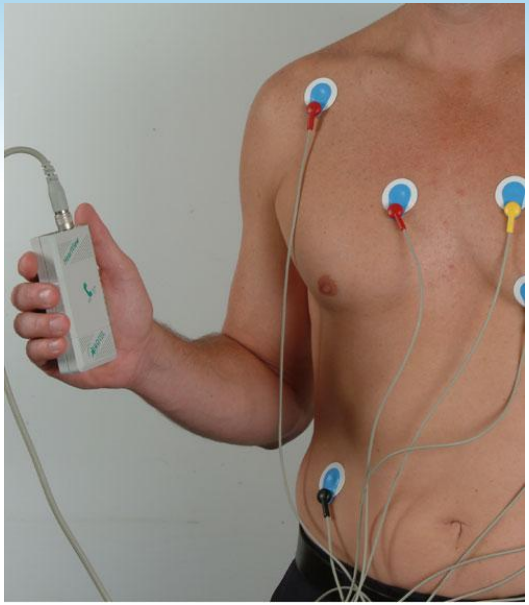
Acoustic Transmission of ECG



Taking ECG with HeartView™

Acoustic transmission of ECG via phone

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HeartView P-12/8 Plus™

12/8-Lead ECG Personal Recorder/Transmitter
Digital, Bluetooth® & Acoustic

- Small, easy-to-operate, 12 or 8 lead ECG monitor.
- Patient records ECG using 3-wire patient cable and four embedded electrodes.
- Gives physicians a clear, comprehensive 12 lead ECG.
- Recorded ECG is transmitted through phone (fixed or mobile) to the HRS for immediate diagnosis.

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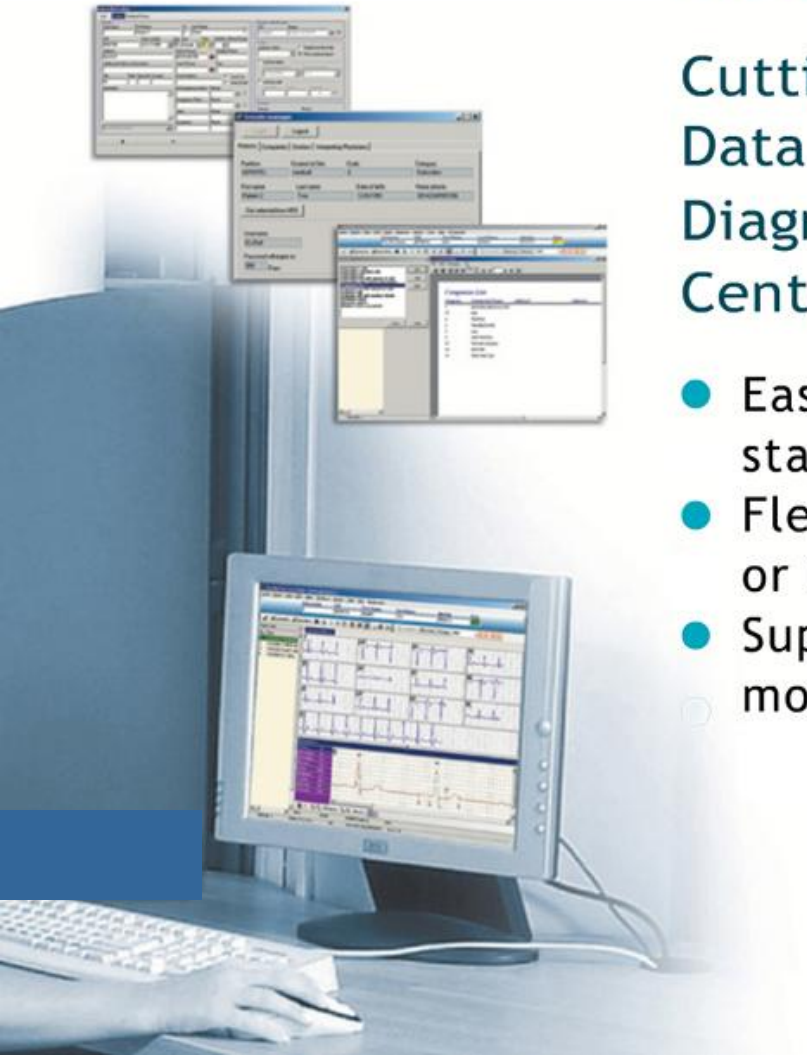

HeartLine Receiving Station (HRS)

Cutting-Edge Technology for Medical Data Acquisition, Disease Management, Diagnostics & Emergency ECG Service Center

- Easy to operate; can be applied to any standard PC equipment.
- Flexible, modular platform(Single station or Network).
- Supports Aerotel's entire line of Heartline monitors.

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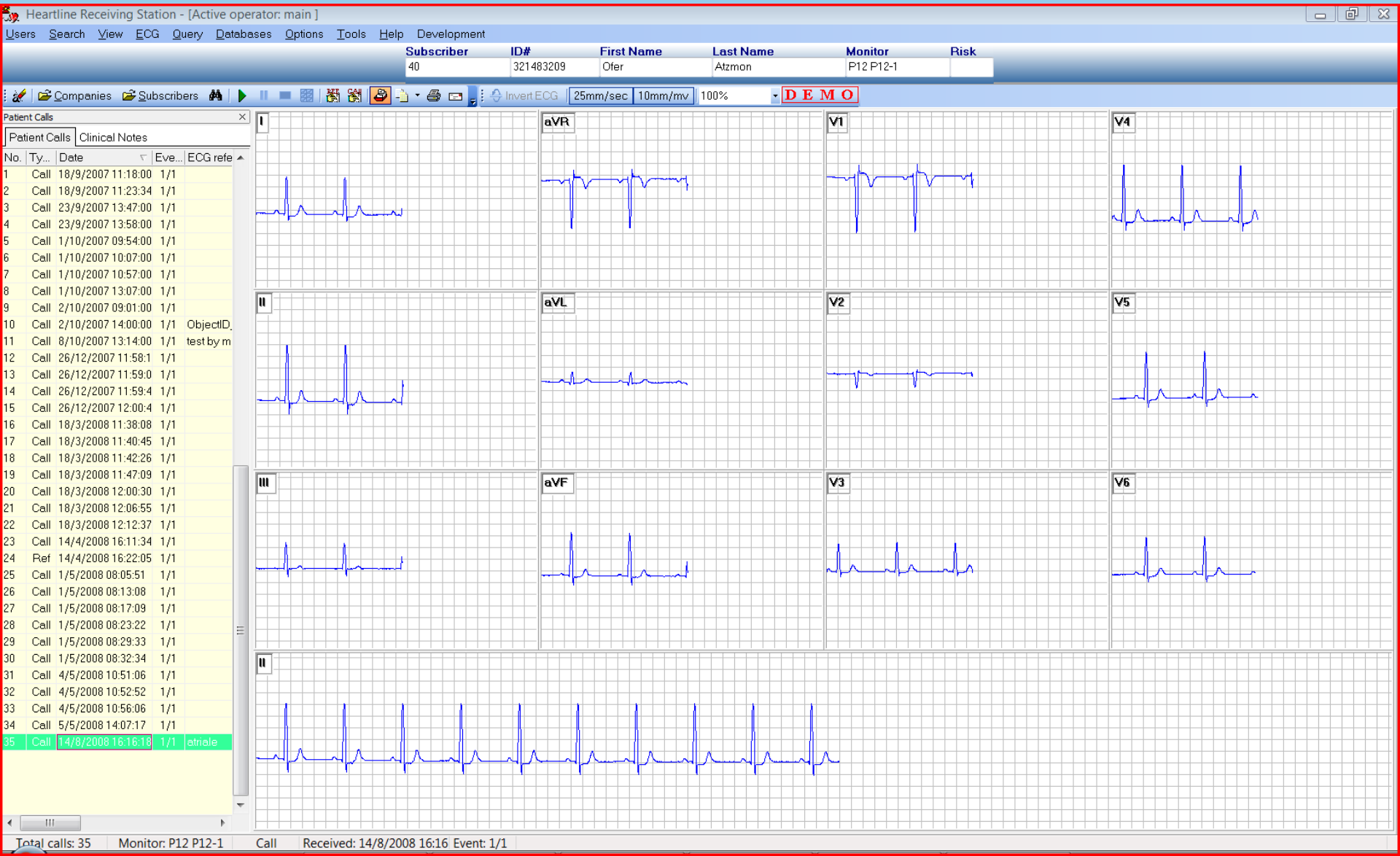
Heartline Receiving Station (HRS)



Heartline Remote Receiver (HRR)

- PC-based solution for tele-cardio-consultation
- Used in a doctor's office or at home visits
- Local viewing and storage of ECG signals from various devices (1-12 leads)
- Transmission via Internet to Aerotel's remote monitoring station (HRS) for viewing, storing, printing and interpretation
- Transmission can be real-time or delayed, as needed

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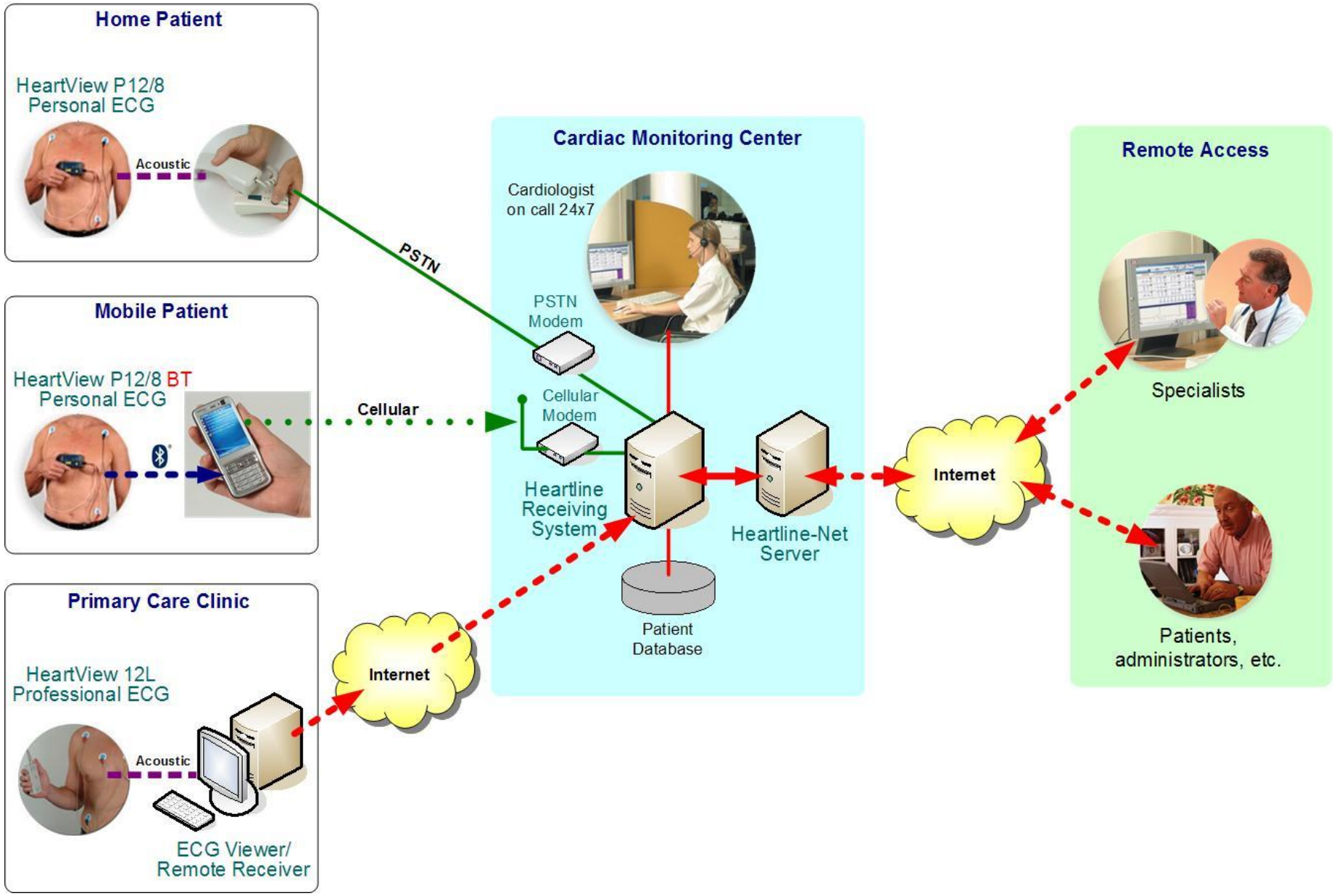
HeartView™ Tele-Cardiology System



The Methodology

- Aerotel HeartView™ hand-held 12-lead ECG recorder/transmitter devices
- Un-manned 24X7 medical call center hosting (HRS) - installed in Helsinki, 240km form the district
- Receiving of ECG signals from clinics and homes
- Nurses doing house calls, equipped with a HeartView™ ECG monitor and a laptop with HRR
- Interpretation of ECGs by expert cardiologists via remote access
- Doctors and nurses received short hands-on training

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How the Devices were Used

- HeartView™ recorded the 12-lead ECG and transmitted it from a patient's home or a primary care clinic
- Transmission was via a laptop PC or a mobile phone
- The ECG was captured at the remote center and displayed on screen - both locally and in regional doctors offices - or printed out
- SSL VPN connection was used
- A reference ECG device was used for control
- Expert cardiologists were able to interpret the results
- Cardiologist did not have to be physically located at the call center, but could access data from anywhere
- During transmission, the cardiologist could be in direct contact with the patient's doctor or nurse, as needed

Preliminary Results

- The results so far indicate that the devices and software are easy to use, and easy to learn
- After basic training doctors and nurses were able to start working with HRS application and regarded the system as logical and easy to use
- PC application (HRR) was found to be logical and gave the opportunity to archive and send further ECGs in electronic form instead of paper prints
- Each tele-ECG saves one primary healthcare laboratory ECG procedure, plus patient travel time
- Cost savings are estimated to be significant and will be evaluated after the pilot

Satisfaction of Stakeholders

- After gaining experience, nurses were more confident to decide themselves if a patient was in need of an ECG test, without referring to the doctor
- Doctors needed very little training and regarded the system as very easy and intuitive to use
- The doctors were satisfied with the quality of ECG signals received and with easy-to-use features and decision-support
- They appreciated the remote access to application regardless of place/time
- The medical directors were satisfied with the quality and efficiency of the service
- Administrators liked that quality diagnostics can be served to citizens even at the first care level by existing stuff at an affordable cost and little investment
- Patients were very please by not having to travel distances to take their ECG and not having to waste time and money on taxi trips

Conclusions

- The pilot addressed the use of telemedicine equipment for undertaking cardiovascular diagnosis and monitoring for patients with cardiac conditions within the home/community environment
- Digital technology based devices together with ICT systems enable new ways of performing medical diagnostics
- Compact size, easy-to-use devices produce premium quality diagnostic information at a **very attractive cost** level.
- With this technology, existing processes can be **re-engineered** resulting in shorter delays, more accurate diagnoses and lower costs
- ECG data can be stored in a **standard format** (SCP) and can be interoperated across different healthcare platforms, including existing and new electronic health record (EHR) systems

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Thank You!

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