



Virtual Hospital - the Future in Europe

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SRU OP 2000, MDC/RRK, Charité, Berlin**

1st National Conference „ ICT's for the Health“, 1. of February 2006, Sofia, Bulgaria



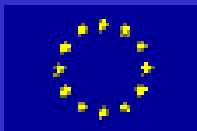
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What is “OP 2000”?

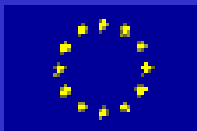
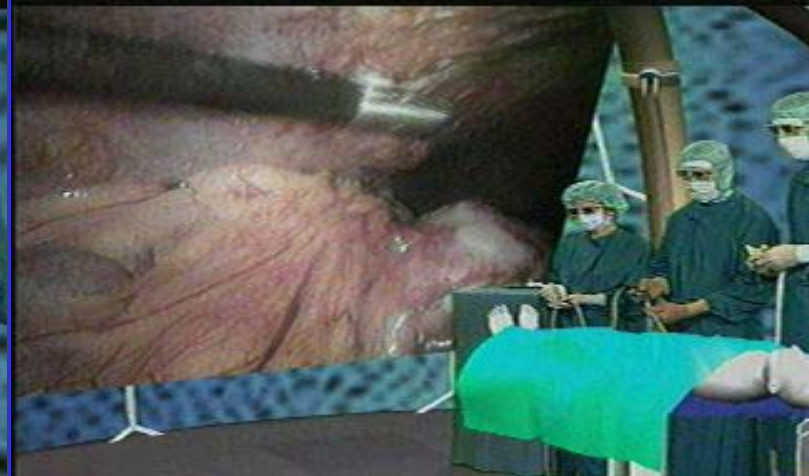
- Surgical Research Unit at RRK-Charité / MDC
- RRK / MDC combine basic- with clinical-research
- Operating Room of the Future
- Combined application of laser / computer / telecom / video technologies
 - navigation & robotics
 - stereoscopic remote video transmission
 - tele-manipulation & tele-presence
 - tele-teaching & tele-training
 - virtual reality & simulation

precise & optimised tumour diagnosis and therapy

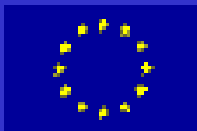
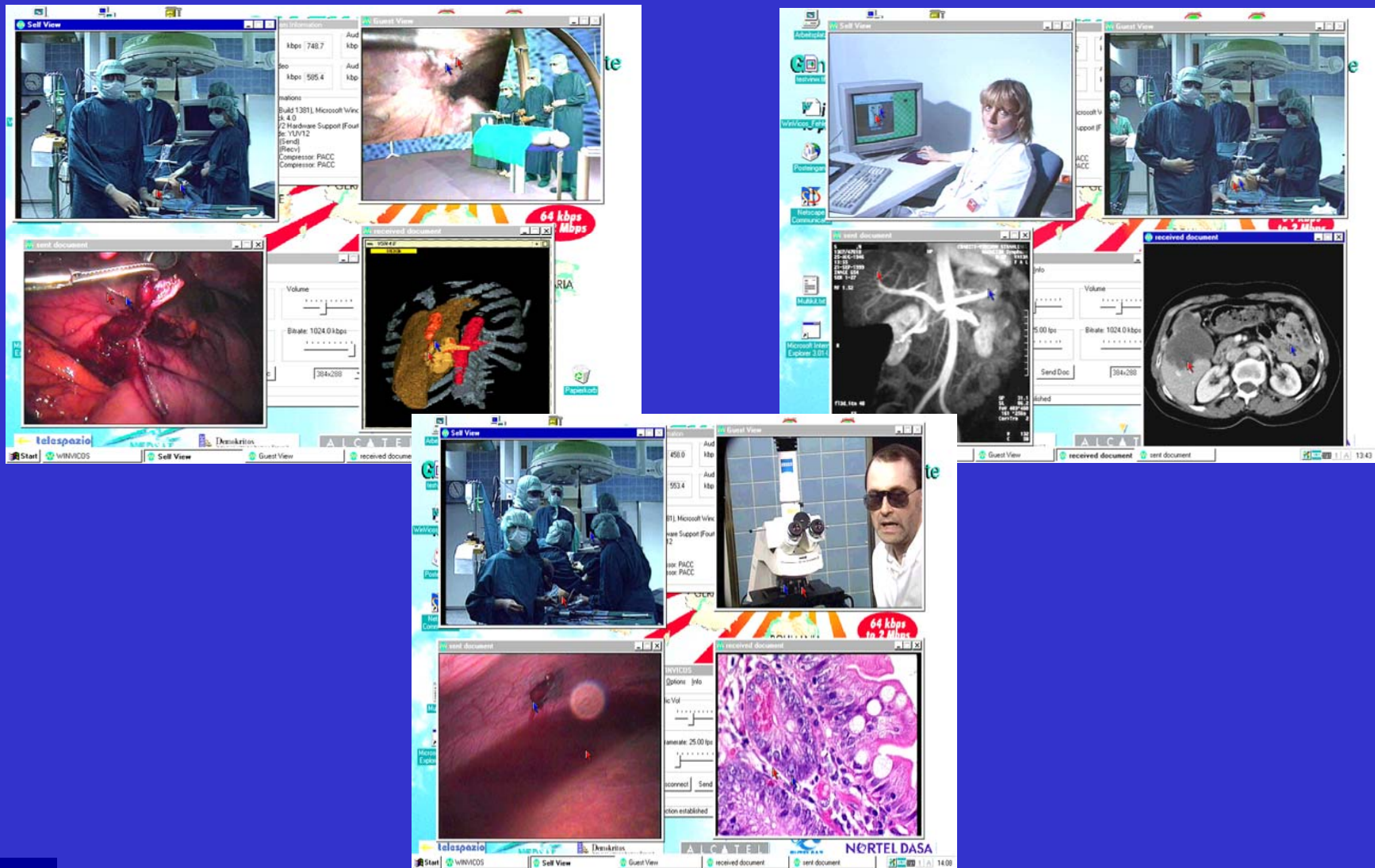
www.rrk-berlin.de/op2000



“Digital” Medicine - Virtual-, Augmented-, Mixed-Reality, and Haptic



“Digital” real-time Medicine

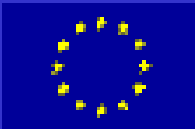


THE WORLD OF MEDICAL MONEY

Total health expenditure/capita

USA	\$ 3,724
Germany	\$ 2,952
Japan	\$ 1,759
Czech Rep.	\$ 640
South Africa	\$ 396
Zimbabwe	\$ 130
Congo	\$ 22

Source: MedSMART 2003



THE TREND – Digital Divide

WE



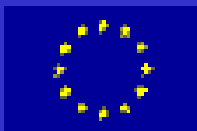
Amassing resources

THEY



Having no resources

Source: MedSMART 2003



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Networks for interactive medical Teleapplications

Bridging the Digital Divide

GALENOS
Generic Advanced Low-cost trans-European Network Over Satellite
 Project carried out with the support of the European Union

64 kbps to 2 Mbps
 Bi-directional exchanges

Pilot network in the field of medicine

- Tele-consultation
- Tele-diagnosis
- Tele-monitoring

Partners: telespazio, MARSAT, Demetris, ALCATEL, EUTELSAT, NORTEL DASA

DELTA
 Disaster Emergency Logistic Telemedicine Advanced Satellites System

Partners: CNES, SPACE-ONE, EADS, ESA

NETWORK OVER SATELLITE

EMISPHER

Nodes: Berlin (OP 2000/Charité), Clermont-Ferrand (CICE), Istanbul (ISTEM Univ.), Athens (NCSR), Palermo (IsMeTT), Nicosia (Univ. of Cyprus), Cairo (Ain Shams Univ.), Tunis (Fac. Med. Tunis), Casablanca (Med. & Pharm Faculty), Alger (ANDS).

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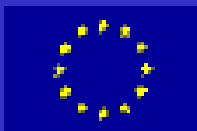
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EMISPHER

Project Infrastructure – Contribution Network

- Satellite network, up to 2 Mbps, mesh topology
- 10 expert centres (Medical Schools and leading hospitals)
- To foster the widest medical and scientific cooperation in the long term





EMISPHER



- Real-Time Telemedicine applications
 - Second Opinion
 - Demonstration and spread of new techniques
 - Telementoring
 - Undergraduate teaching courses
 - Optimization of the learning curve
- Results: More than 250 interactive video conferences in the EMISPHER Network

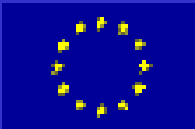


Lessons from the applications

Different protocols

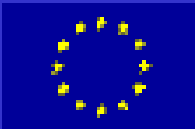


- Security
- Firewall
- Language
- Law



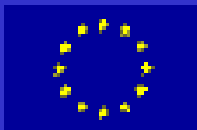
Background of VEMH

- Telemedicine aims at equal access to medical resources for everyone at any time and anywhere
 - Digital divide: ICT amplifies disparity in quality of life
- ⇒ Need for real integration of ICT platforms and telemedical services
- ⇒ from aid towards multi-lateral cooperations



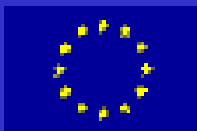
Services of VEMH

- **Euro-Mediterranean Medical University**
improved qualification by exchange and standardization of educational modules
- **Real-time Telemedicine**
improved quality of patient care and qualification of staff
- **Medical assistance**
improved continuity of care to stimulate tourism
- **Implementation of Evidence-based medicine**
improved disease management and individual therapies
- **Fellowship programmes for young professionals**
improved qualifications in multi-cultural and inter-disciplinary settings



Methodologies of VEMH

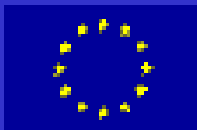
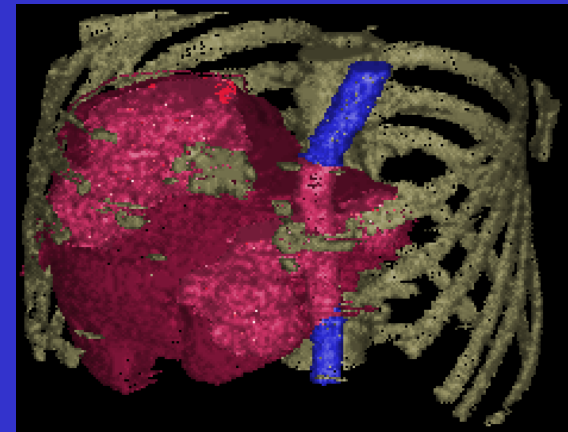
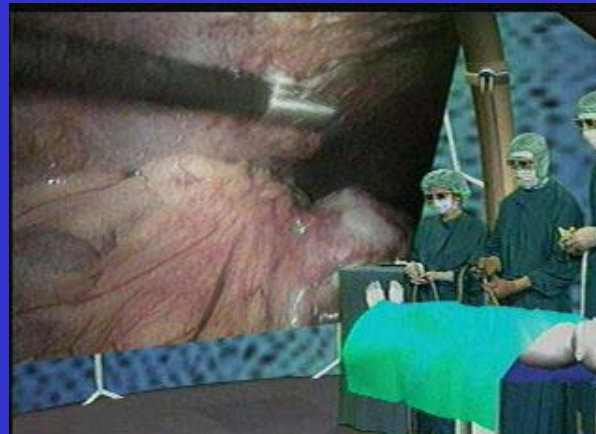
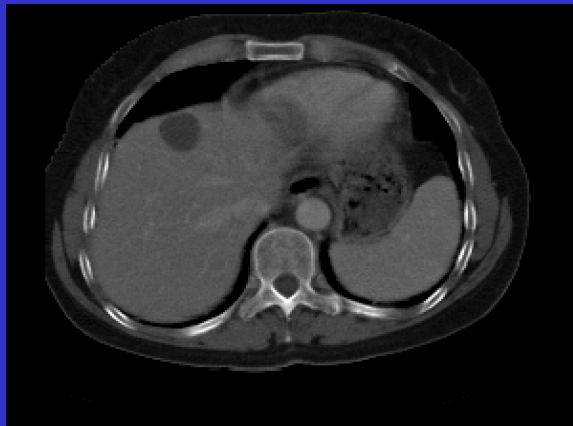
- Medical-needs-driven instead of technology-driven!!!
- New management tools for virtual medical communities
 - trust- and synergy-building measures
 - balance between technological and interpersonal skills
- Management of clinical outcomes
 - improved implementation of evidence-based medicine
- Modular architecture
- Integration of different telemedical solutions in one platform to support many different medical services (matrix structure)
 - individual user needs (as matrix columns)
 - technical solutions (as matrix rows)
- Data Security & Patient's Privacy



Global Health - VEMH

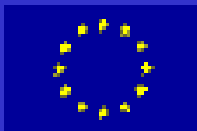
Simultaneous and synchronized access from local and remote

- collaborative access of patient data
- collaborative manipulation
- collaborative control

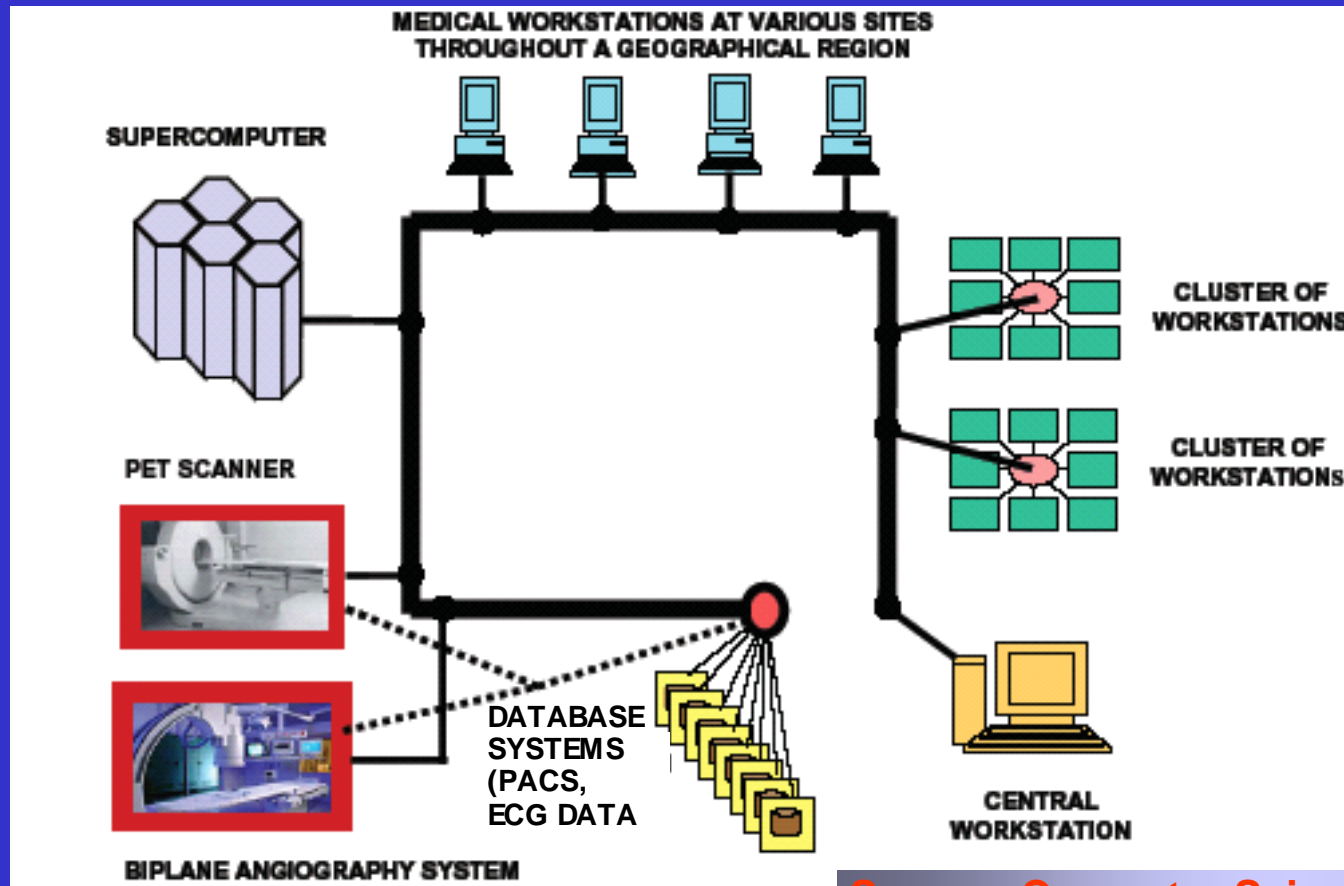


GRID for VEMH

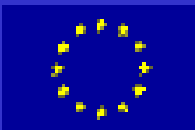
**flexible, secure and consistent
resource sharing & problem solving
architecture
among dynamic collections of
individuals, institutions and
resources**



Grid configuration for medical applications



Source: Computer Science, Univ. Innsbruck



VEMH -Technology of Interacting



FRANCE



6,500 km



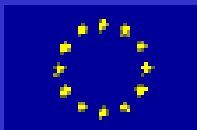
USA

Project FAME

Source: MedSMART 2003



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VEMH - Integration of Means



Simulators



Displays

Source: MedSMART 2003



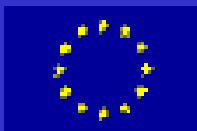
Virtual Reality



Advanced
Telecomms

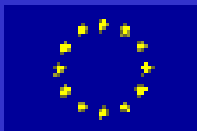


Medical Command
Centres



VEMH - Getting evidence into medical practice

- Innovative methods for disseminating evidence into practice
- Translation of evidence into knowledge for practising physicians



VEMH - Future Medical Developments

Computerisation – Miniaturisation- Molecularisation
the Nanomedicine ?

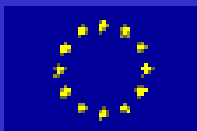
classic

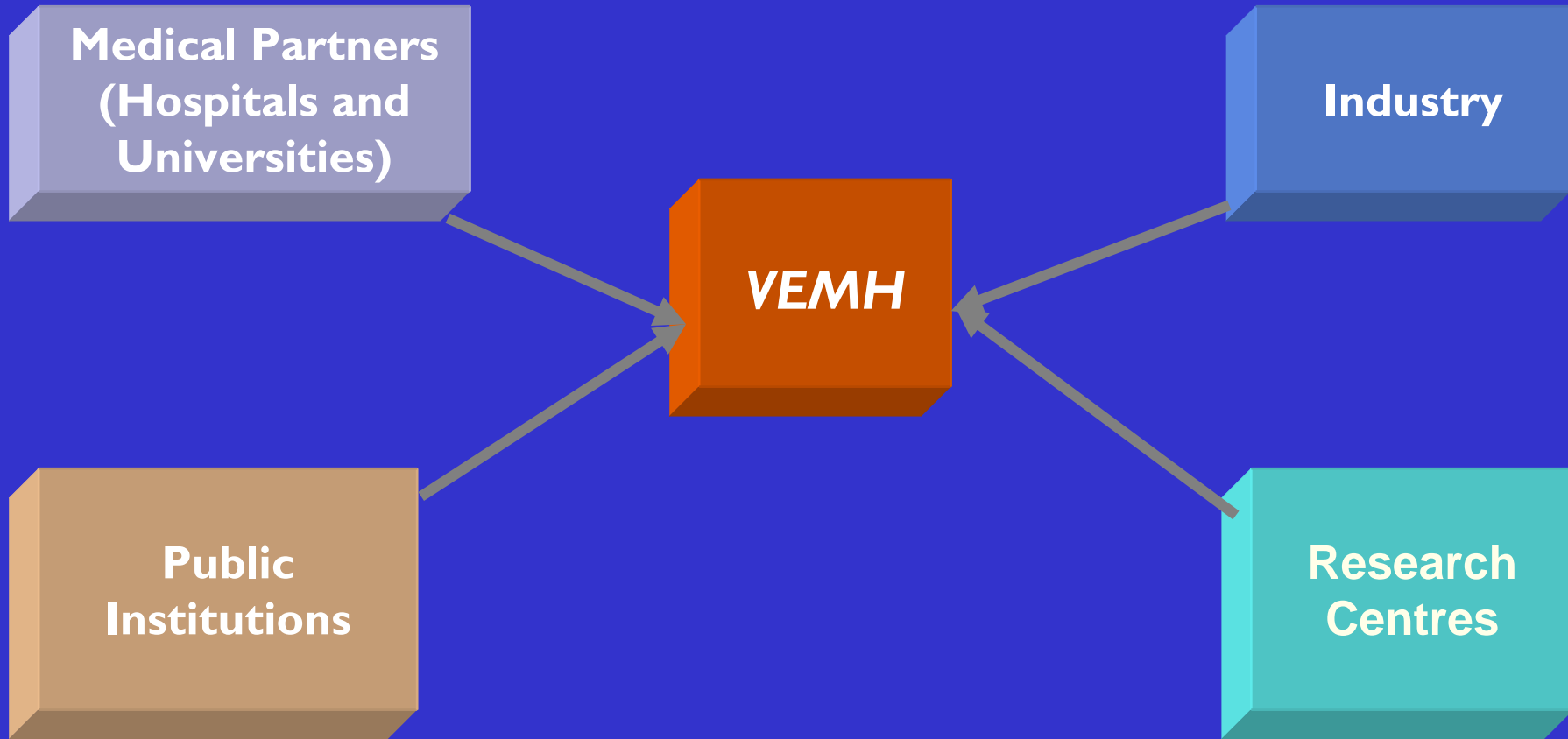
diagnosis and treatment of
disease symptoms

future

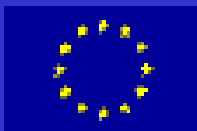
preventive and personalized
medicine:

- molecular diagnosis
- molecular imaging
- molecular therapy

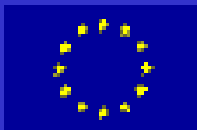
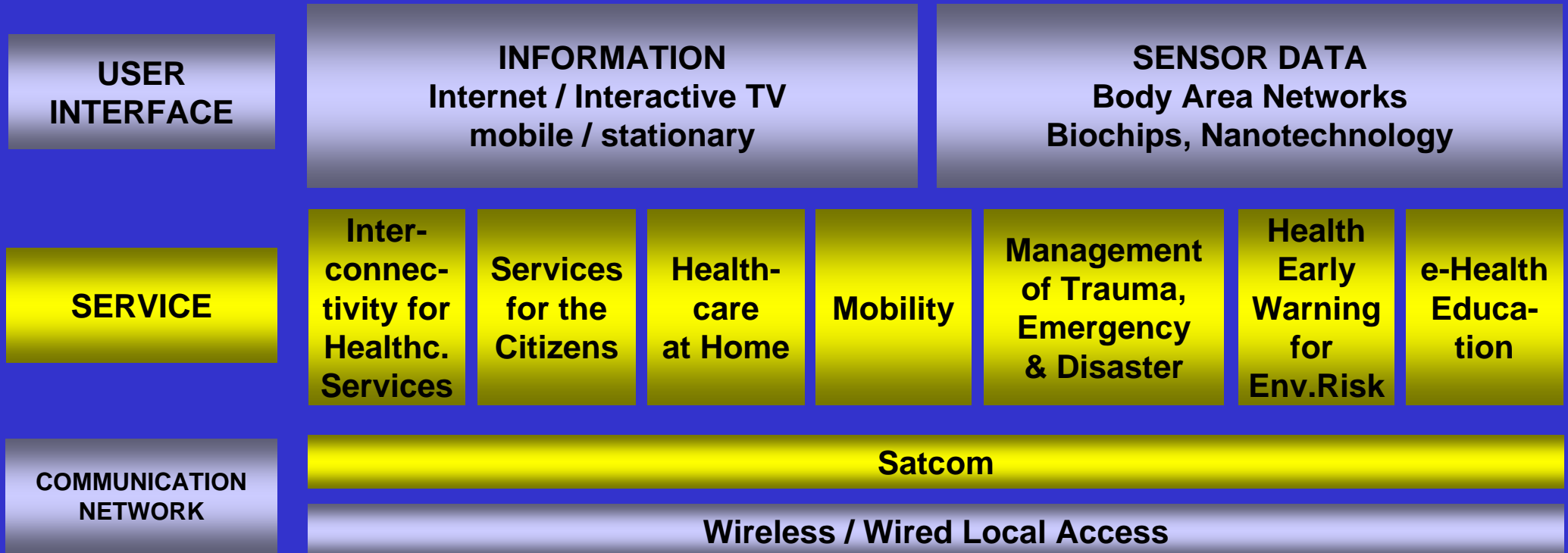




The VEMH Consortium constitutes an original partnership between Euro-Mediterranean Health care professionals and industries for the delivery of telemedical services for global health care.



eHealth and Telemedicine today



Realised by the year 2008 (EU)

- **Electronic Health Records**
- **Electronic Health Insurance Cards**
- **Europe-wide patient identifiers**
- **Interoperability of the various cards, etc.**
- **Medical eLearning for health professionals**
- **Harmonisation of reimbursement and liability issues**
- **European Public Health Portal for citizens**

⇒ Creation of a European eHealth Area

